

THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

Published every Thursday Morning by David Williams Co., 232-238 William St., New York.

Vol. 75: No. 25.

New York, Thursday, June 22, 1905.

\$5 00 a Year, including Postage
Single Copies, 15 Cents.

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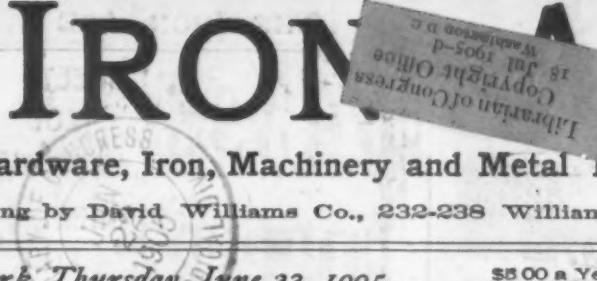
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THE IRON AGE

New York, Thursday, June 22, 1905.

Steel Work in the New York Sixty-ninth Regiment Armory.

Some noteworthy steel work enters into the construction of the new armory for the Sixty-ninth Regiment on Lexington avenue, between Twenty-fifth and Twenty-sixth streets, New York City. This particularly applies to the part of the building shown in the accompanying illustrations, which will accommodate the drill hall. In front of this part there will be a four-story and basement building, containing the company rooms, reception rooms, officers' headquarters, &c., and at the opposite end there will be a four-story wing to be used as a hospital. The entire site is about 197½ x 305 feet. The drill hall proper is about 202 feet long, 188 feet 10 inches

and were bent at the shops. The upper chords follow a nearly corresponding contour, but are made in straight line sections. Each arch was designed for a horizontal reaction at the crown hinge of 77,300 pounds, a thrust of 61,800 pounds and a resultant reaction of 179,000 pounds at the skewback. The trusses vary in radial depth from about 4 feet at the skewbacks and 5 feet at the crown to a maximum of about 9½ feet about midway between the crown and lower ends. The hinge pins at the lower ends of the arches are 4½ inches in diameter, and the crown pin is 3 inches in diameter. The bearings in the arch are designed with a certain amount of clearance to allow for temperature changes.

The two members forming each arch, known as semi-trusses, were each riveted at the shop in four sections

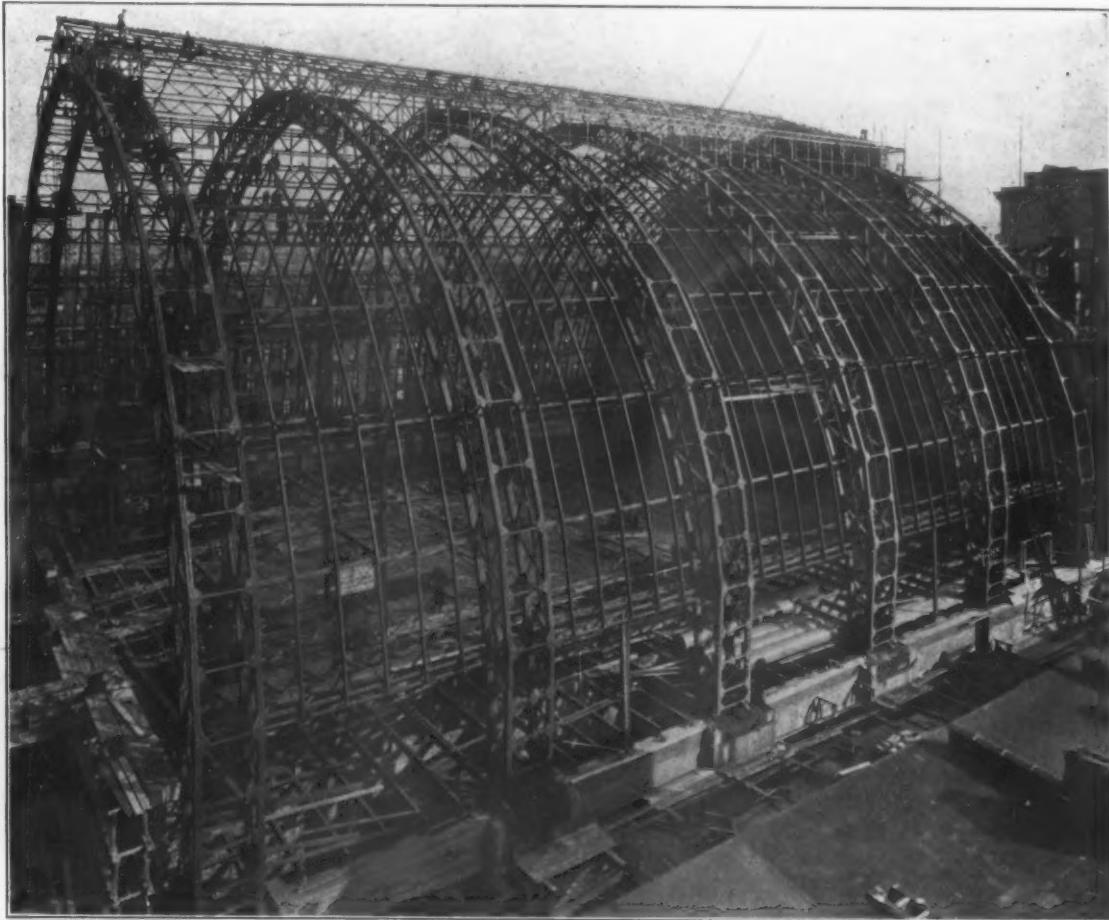


Fig. 1.—The Completed Steel Frame of the Sixty-ninth Regiment Armory Drill Hall.

wide and nearly 130 feet high above grade. The unobstructed interior height from the floor to the lower chords of the roof trusses at the crown is 99 feet 10 inches. Up to the level of the second floor of the front part of the building the side walls are brick and concrete. Brick gable walls inclose the ends. Balconies, supported by steel cantilevers, will extend completely around the drill hall.

The most interesting part of the construction and that which differs from the ordinary steel building construction is that which supports the drill hall roof, the latter being carried by six pairs of riveted arch trusses hinged at the crown and at the lower ends. The span of these trusses is 189 feet 8 inches, and the height from the horizontal center line through the skewback pins to the crown pin is 103 feet 4½ inches. The lower chords of the arches are curved continuously from skewback to skewback

and were spliced together on the ground just prior to erection. Each complete truss weighs about 69,000 pounds. The thrust of each arch is taken by a horizontal tension member connecting the skewback pins. Pairs of I-beams form the ends of these members and constitute floor beams in the basement ceiling, and the ends are tied together by two 1½-inch bars, with turnbuckle adjustments in the center. The trusses are braced together in pairs 6 feet 8 inches apart on centers, and the pairs are 38 feet 9½ inches apart on centers. Between the pairs of trusses are 14 longitudinal purlins, exclusive of the skylight framing, and the purlins carry five intermediate lines of I-beam rafters. The latter support the concrete slab roof and have their outside surfaces approximately flush with the center line of the trusses. The skylight is about 80 feet wide and extends the full length of the drill hall, 202 feet.

The general appearance of the building at the time the steel frame work was completed is shown in Fig. 1. Fig. 2 is of interest as illustrating the manner in which the semitrusses were raised. These were assembled on the floor and were raised into position by four 60-foot booms mounted on the corners of two traveling towers 25 feet square by 116½ feet high. The towers traveled on eight doubled flanged wheels running on two rails 25 feet apart. A hoisting engine plant was carried in the lower part of each tower, each plant containing a Lidgerwood double drum hoisting engine. Hand and pneumatic riveters were used in the assembling of the arches.

Roebling standard reinforced concrete fire proof con-

The Production of Mica in 1904.

WASHINGTON, D. C., June 20, 1905.—The annual report of the United States Geological Survey upon the production of mica in the United States in 1904 shows a substantial increase in quantity, but a decrease in value, due to the larger utilization of the low grade product. Formerly the chief and almost only use of mica was for cutting into sheets of varying sizes, which were used for stoves; the very small sizes and all the very small pieces of the waste obtained in mining and in cutting the sheets were thrown away. Now, however, there is a very large demand for mica for electrical purposes, and this has resulted in the utilization of a great quantity of the small

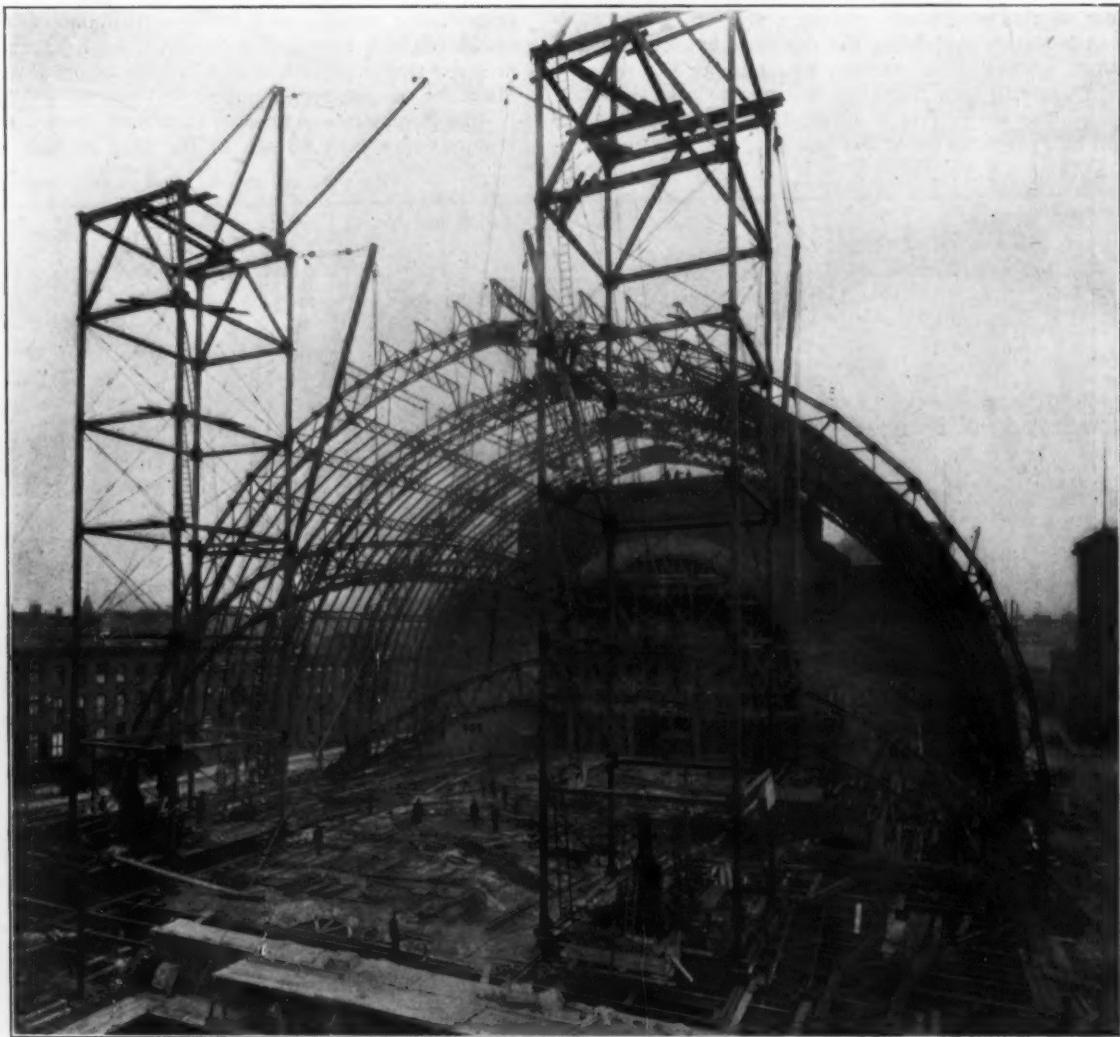


Fig. 2.—Illustrating the Raising of the Semi-Arch Trusses.—Steel Work Furnished and Erected by Milliken Bros., New York.

struction was used in the roof and floor. The roof slabs are covered with a special water proofing composition made by the Star Composition Roofing Company, New York, which is claimed to have the property of remaining soft in cold weather and hard in hot weather.

The architects of the building are Hunt & Hunt, New York City; M. Lewinson is the consulting engineer; James D. Murphy Company, the general contractors, and J. R. French, the superintendent of general construction. Milliken Bros., New York City, built and erected the steel work.

Allen & Reed, Incorporated, Providence, R. I., have removed from their old location at 125 Eddy street, where they commenced business three years ago, to the block bounded by Dorrance, Dyer, Clifford and Orange streets. The building is of four floors, the whole of which they occupy. They are dealers in steam supplies and are contractors for power and heating plants, for mills, factories, water works and automatic sprinkler installations.

pieces of mica that were first thrown away but afterward came to be used as scrap mica, which was ground. These pieces are now cut by machinery into small circular disks (1 inch in diameter) and rectangular pieces ($\frac{3}{4} \times 2$ inches), which are used for insulation purposes in electrical apparatus. Larger sheets of mica are also used for electrical purposes, but it has been found that large sheets can be built up from small ones which will give as satisfactory results as the single large sheet and are, of course, not so expensive.

Ground mica, which is separated into different sizes and grades, is now being utilized for a great variety of purposes. The coarser grades are used in the manufacture of fire proof materials, principally paint, and for covering steam pipes, boilers, &c., to prevent radiation of heat. In the manufacture of lubricating materials the mica must be ground to a still finer degree, and the very finest product is used in the manufacture of certain kinds of wall papers, for other decorative purposes and in the manufacture of paints.

The total quantity of sheet or plate mica produced in

the United States during 1904, as reported to the Survey, was 668,358 pounds, valued at \$109,462, an increase of 48,758 pounds in quantity, but a decrease of \$8626 in value, as compared with a production of 619,600 pounds, valued at \$118,083, in 1903. The reports of sheet or plate mica for 1900, 1901 and 1902 were 456,283, 360,060 and 373,266 pounds, respectively. The production of scrap mica during 1904 amounted to 1096 short tons, valued at \$10,854, as against 695 short tons, valued at \$6460, in 1903. During 1903, however, there were also reported 964 short tons, valued at \$18,580, which were sold in the rough blocks as produced. This probably made at least 800 tons of scrap mica, so that the actual production of scrap mica in 1903 was greater than that in 1904.

Of the 1904 production 610,121 pounds of sheet mica, valued at \$100,724, and 200 short tons of scrap mica, valued at \$2000, were produced in North Carolina. This was over nine-tenths of the total production of the United

The Johns Patent Punches and Shears.

The construction of the frames of the Johns patent punch and shearing machines is their most characteristic feature of individuality. Instead of the usual cast iron frames these machines have frames built up of steel plates riveted together. The advantages claimed for this form of construction are a saving in weight and floor space and greatly decreased liability of breaking. These machines are also claimed to be fitted with a very efficient driving mechanism, making it possible to save power to such an extent that it is stated that these tools may be driven to their full capacity with no more driving power than would be needed to start cast iron tools. The Johns tools, a number of which are shown in the accompanying illustrations, are built by Henry Pels & Co., 68 Broad street, New York City.

Fig. 1 shows a motor driven portable punch in which

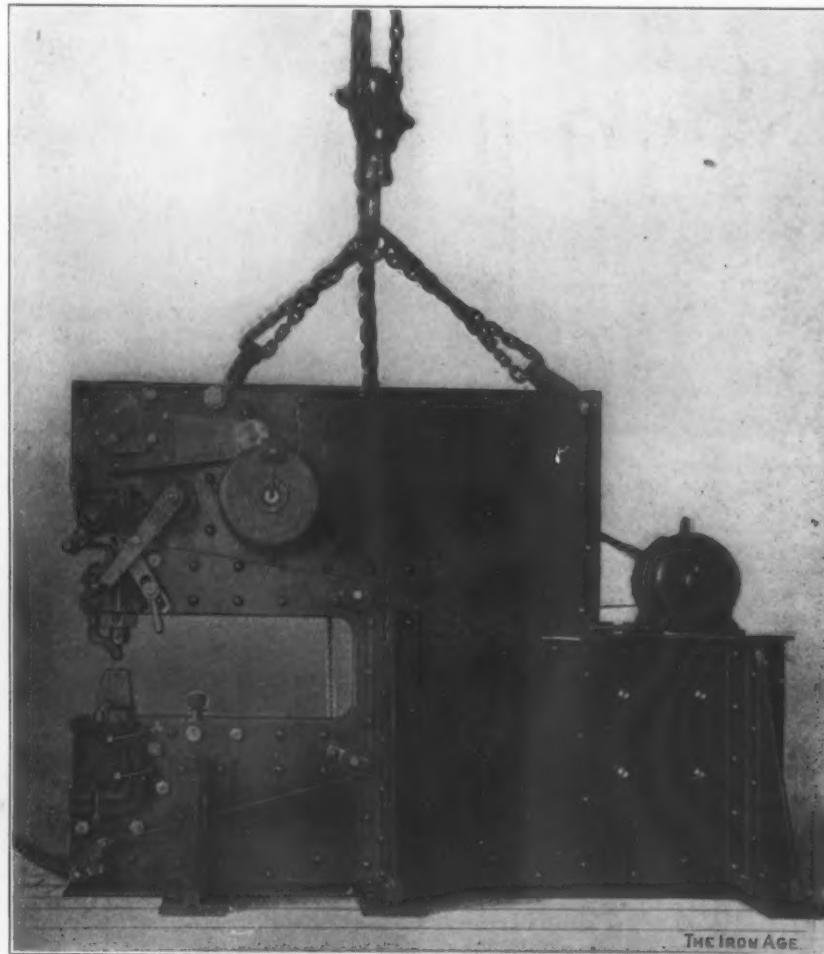


Fig. 1.—Johns Motor Driven Portable Punch, Built by Henry Pels & Co., New York.

States in 1904. Other States which contributed to the output of 1904, in the order of their importance, were New Hampshire, Colorado, New Mexico, California, Georgia, South Dakota, Idaho and Connecticut.

When the figures of production are compared with those of the imports it will be seen that of late years the latter have been several times greater than the home production. This is partly due to the fact that mica from Canada and India, which can be entered at a low valuation, has a tendency to curtail the production of mica in the United States. The value of the imports of mica for the past five years is given as follows: 1900, \$319,560; 1901, \$335,054; 1902, \$466,332; 1903, \$317,969; 1904, \$263,714.

W. L. C.

The Interstate Engineering Company, Cleveland, Ohio, with works at Bedford, Ohio, has opened a Chicago office at 706 Fisher Building, in charge of Edmund G. Fisher. Mr. Fisher is well known through his past connection with the American Steel & Wire Company.

special attention has been given to the construction of the plunger mechanism. The plunger is substantially guided and is easily adjustable to suit the thickness of the material to be punched. The height of the stroke being adjustable, the punch may be stopped just above the work and can then be lowered by hand while the material is located with reference to a center mark to insure correct punching. The controlling arrangement allows the machine to punch continuously or to be started and stopped between each operation, either by hand or foot. There is a pause after each stroke, which allows time to bring the material into position for the next punching. In this machine an important feature is the ability to raise the punch high enough to entirely clear the throat of the machine. As indicated in the illustrations, the machine may be handled from part to part of the shop by an overhead crane and thus be brought to the work when that would be more convenient than bringing the work to the machine.

The lever mechanism for operating the plunger head

transmits the great power of a high speed fly wheel, running at about 400 revolutions per minute, to a slow speed driving shaft, running about 20 revolutions. The rotary movement of the fly wheel shaft is communicated through a crank and link to the end of an oscillating lever. The latter contains a small knuckle which presses against a knurled or toothed ring

length and width. Ordinary shears by their depth of throat limit the width which may be sheared. These machines have no worm gears nor circular knives, the mechanism being similar to that employed in the machines already described. They are built in five different sizes and are therefore adaptable for light as well as for the heaviest work. Knives for cutting round and square

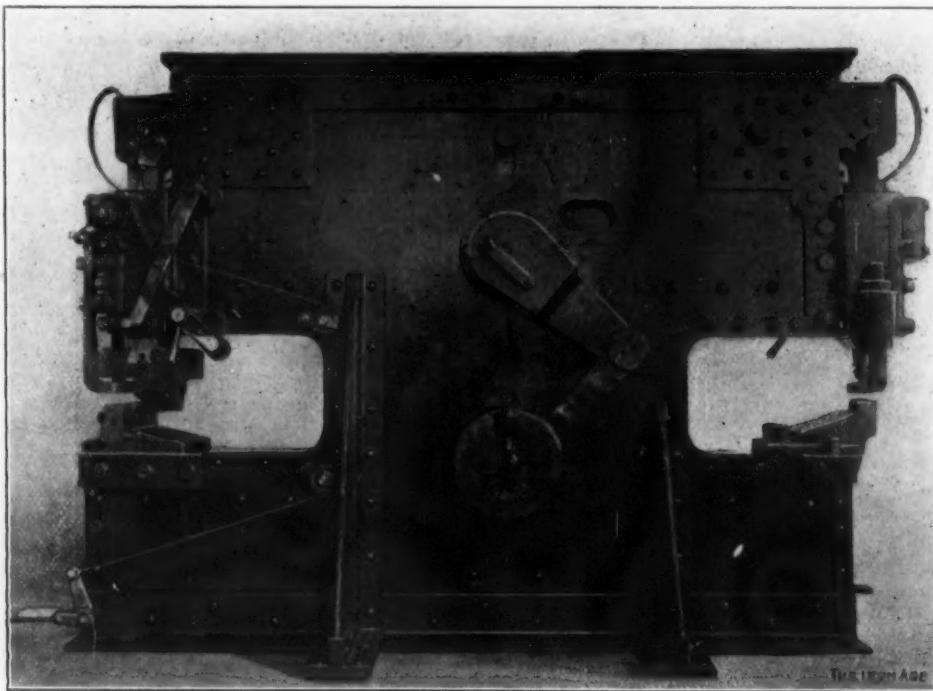


Fig. 2.—A Johns Double Ended Punch and Shear.

keyed on the plunger driving shaft. The knuckle when oscillated turns the shaft in one direction, and during its return stroke the shaft is held against rotation by a ratchet and pawl. The simplicity of this transmission by avoiding friction and bearing pressure allows the use of the entire fly wheel power. The main shaft runs in a gun metal bush of a long ring lubricated bearing. The driving mechanism can be thrown out of gear by a little lever so as to save the mechanism from unnecessary wear, and will save power, which is important when heavy material is handled.

A doubled ended punch and shear is shown in Fig. 2. The punch end of this machine is capable of punching 1-inch holes through 1-inch material and has an overhanging jaw for structural work. The opposite end of the machine will shear plates up to 1-inch thick and flat bars at one stroke up to $3\frac{1}{2} \times 33\frac{1}{16}$ inches section. The depth of the throats on both sides of the machine is 24 inches. The shearing knives are 12 inches long. The fly wheel is 35 inches in diameter and is intended to run at 350 revolutions per minute. The driving pulley is $2\frac{1}{4}$ inches in diameter and accommodates a belt 4 inches wide. At its maximum capacity, with both tools working at the same time, the machine requires 6 horsepower. It occupies a floor space of 8 feet 8 inches x 3 feet 7 inches, stands 6 feet 3 inches high and weighs approximately 13,650 pounds.

The splitting blades are set at right angles with the frame of the machine, while the cut off shearing tools are mounted parallel with the frame. The shearing plunger may be also arranged to take a punch or angle knives. Both ends of the machine are fitted with plunger construction similar to that in the punch illustrated in Fig. 1 and are controlled either by hand or foot. The die blocks are arranged to punch flanges and webs of 24-inch beams close to the corner. American standard punches and couplings are used, and a platform is provided upon which a motor may be mounted when it is desired to employ individual electric drive.

Fig. 3 illustrates a plate shearing machine which is unique in being capable of splitting plates of unlimited

bars, angles, tees, &c., can be provided. Bars may be cut in the right hand section of the machine.

Two forms of beam shears are shown in Figs. 4 and 5. These are adapted for the cutting of beams, channels, angles and other structural shapes. Claims made for them are simplicity, durability and large capacity and advantages over hot and cold saws for hydraulic shears

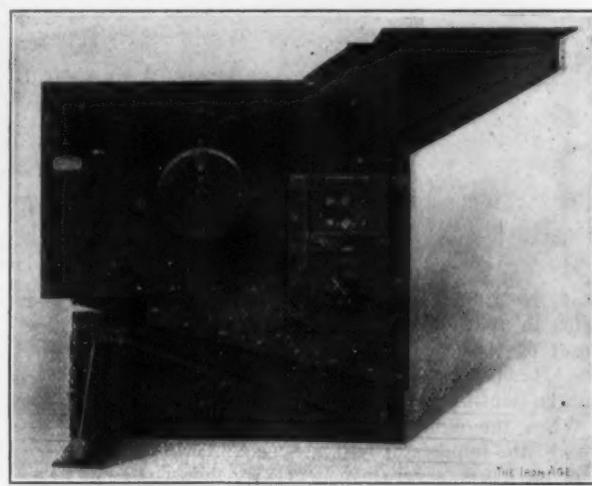
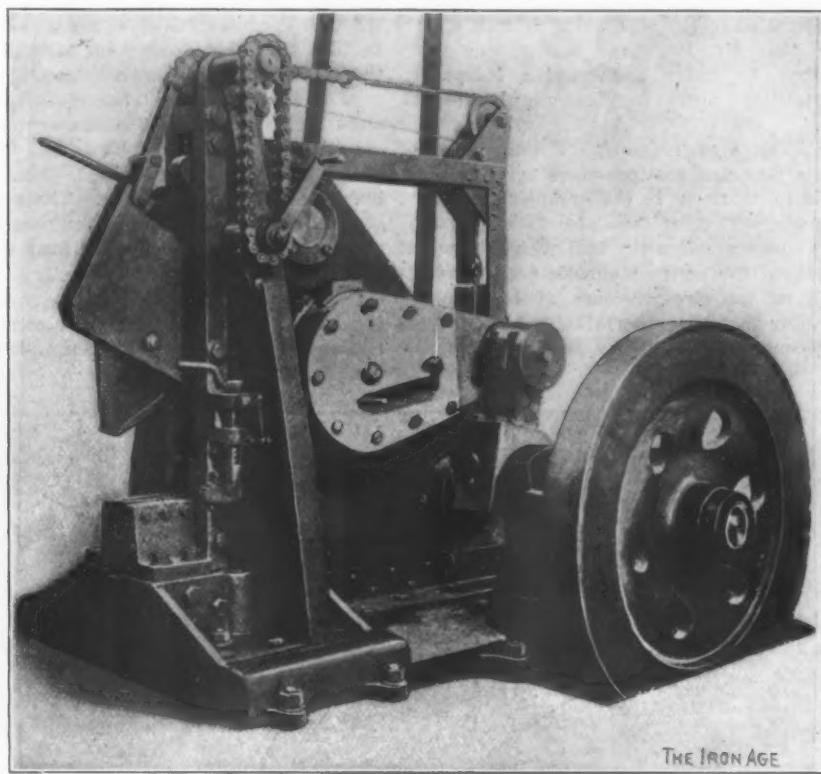


Fig. 3.—A Plate Shear Capable of Handling Work of Unlimited Size.

for the same class of work. Where heavy, unhandy pieces of various shapes have to be cut, if the changing of knives is necessary for cutting each different section, much valuable time would be wasted. These machines generally use two sizes of upper knives and corresponding blocks, the changing of which may be easily accomplished. The knives being placed outside the frame allow the material to be placed in position with the greatest convenience and without any special securing. It is

claimed that the cutting does not disturb the section of the work and that the surface is so clean that no trimming with hammer and chisel is required. It is also

being produced by the Bessemer process 423,742 tons of acid and 5,525,429 tons of basic steel, and by the open hearth process 130,546 tons of acid and 2,697,760 tons of



THE IRON AGE

Fig. 4.—Johns Beam Shear, Built by Henry Pels & Co., New York.

claimed that about one-tenth of the power required for high speed saws is all that is needed. These beam shears are in operation in rolling mills, beam and ship yards, structural iron works, &c.

The production of steel in Germany amounted to 8,930,291 metric tons in 1904, as compared with 8,801,515 tons in 1903, 7,780,682 tons in 1902, 6,394,222 tons in 1901 and

basic steel. Of the output of steel castings 56,409 tons were acid and 96,405 tons were basic steel.

Since January 1 the Westinghouse Air Brake Company, Pittsburgh, has received orders for equipping more than 150,000 cars with the Westinghouse friction draft gear. The company recently received an order from the Mis-

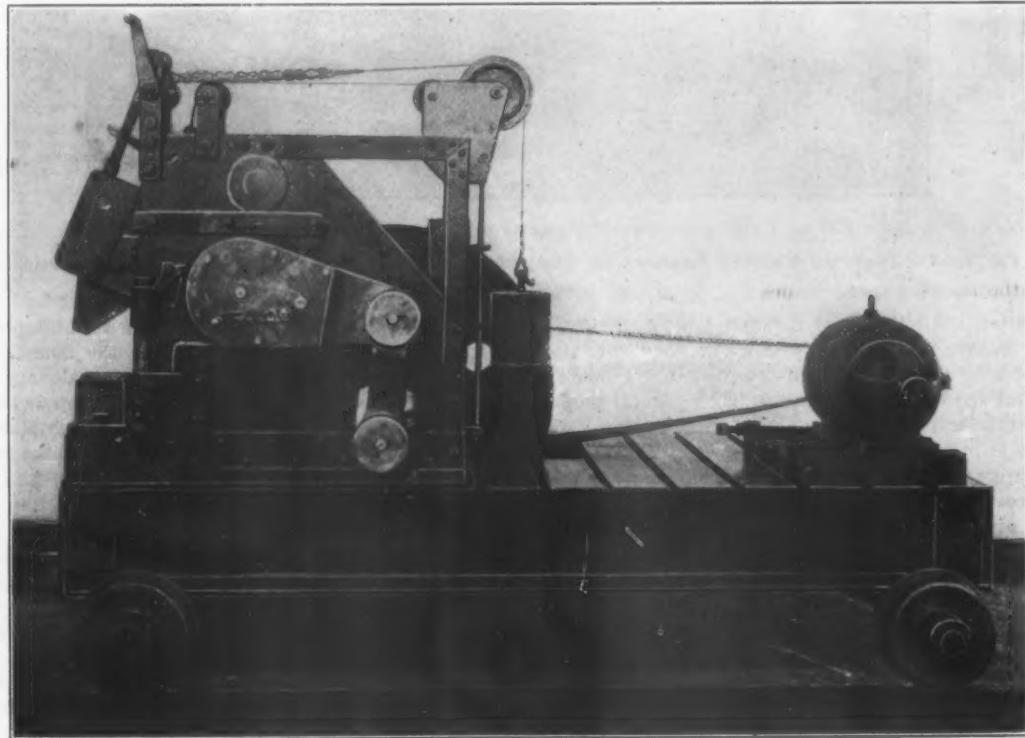


Fig. 5.—Portable Electrically Driven Beam Shear.

6,645,869 tons in 1900. Of the product in 1904, 610,697 tons were acid and 8,319,594 tons were basic steel, there

souri Pacific Railroad Company to equip 5000 cars with this gear.

The Buchanan Magnetic Separator.

On several occasions during the past 20 years *The Iron Age* has contained mention of the Buchanan magnetic separator as applied to the separation of iron ores, and it is believed that Mr. Buchanan was among the first, if not the first, to design and build a complete crushing and magnetic concentrating plant for the treatment of lean ores.

The separator illustrated herewith is a new type brought out about a year ago, and possesses several new features of interest particularly in the arrangement and design of the magnets, which, unlike those in any other drum separator, produce a magnetic field which is perfectly equal throughout the entire magnetic zone, covering about one-half of the circumference of the drum. Owing to this peculiar feature material attached to the drum is held by a constant and unvarying tractive force

brush or scraper is required. The heads of the drum are of machinery brass, carefully machined to standard gauges. The drum is of brazed copper or brass, covered in some cases with rubber, and the current or magnetic traction is controlled by a special rheostat in the circuit, so that the machine can be instantly regulated to suit the material to be operated upon.

For separating ores the machine is built in several sizes from 18 inches in diameter up to 36 inches, with capacities from 50 to 500 tons per day, according to the size and nature of ore treated. Fig. 1 illustrates a plain hopper suitable for fine ore. The separator, however, is generally furnished with an automatic feed roller which gives a perfectly even and uniform flow and distribution over the surface of the drum.

A modification of this separator is made for separating iron turnings from brass, pieces of scrap iron from rubber stock, &c. Fig. 2 gives a side and an end eleva-

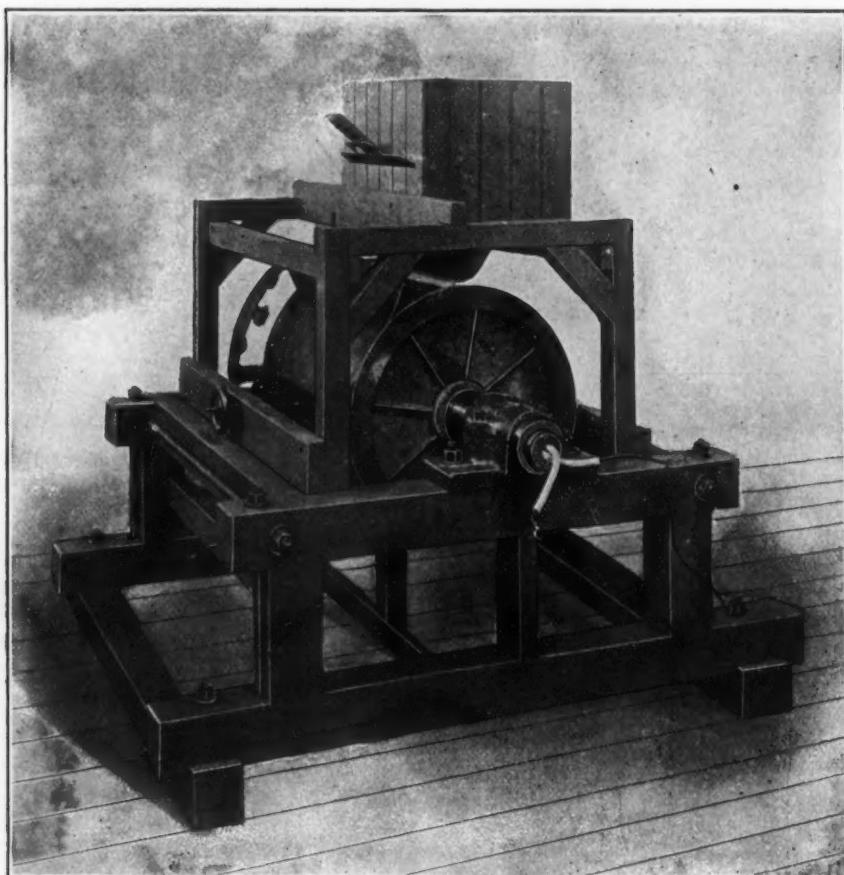


Fig. 1.—The Buchanan Magnetic Separator for Fine Ore, Built by the Geo. V. Cresson Company, Philadelphia.

to the drum until it passes through the magnetic field.

This feature is particularly valuable for "rough cobbing" of 2 or 3 inch pieces of iron ore, as it has been found that the ordinary separator having small magnets placed at intervals will drop large pieces of ore when the piece is passing between the magnets. The magnetic field produced by the ordinary arrangement of magnets gives irregular lines of force, which results in unequal traction and has the effect of producing very strong and very weak sections on the surface of the separating drum, rendering it very difficult to adjust the machine to operate on unsized product, such as iron ore as it passes through a crusher varying in size from $2\frac{1}{2}$ inches down to $\frac{1}{8}$ inch and finer.

The exciting coils of this separator are not wound upon the magnets, but are wound on a form, and insulated between gaps in the magnet, which is made sectional, so that repairs can be cheaply and quickly made. The magnets are made of special open hearth steel, and are machined all over. The magnet is movable and can be adjusted to deliver the separated material at any point desired. The rear of the drum is not magnetic and no

tion of this machine, with a shaking feed adapted to feed turnings or similar material upon the drum. A is the revolving drum, rotating upon the stationary shaft B, and driven by the pulley C. The clamp boxes D hold the shaft firmly in position. The hopper E is open at the bottom and the material to be separated rests upon the inclined chute F, which is lined with hard sheet brass. A vibratory movement is given this chute by means of the cam and cam shaft G, driven by chain and sprocket wheels from the hub of the drum. The stroke can be adjusted to regulate the flow of material on the drum A. The tension spring H accelerates the downward movement of the chute F, which strikes upon rubber or leather buffers.

When it is desired to stop the feed the hinged chute is lifted several inches and hung up in a stationary position by means of the hook I. The adjustable brass shield J is intended to keep the material from being thrown off the drum by centrifugal force and, in keeping the stream of material to be separated in close proximity to the drum, it is of great assistance in separating weakly magnetic substances. The adjustable swinging gate K is

intended to act as a partition between the magnetic and nonmagnetic material, so that a mixture of the separated material with the tailings is impossible.

This style of separator is made in two sizes, one with a drum 14 inches in diameter and from 6 to 18 inches long, and the other with an 18-inch drum from 8 to 24 inches long. These are supplied with small dynamos of standard make, together with an ammeter for recording and a rheostat for regulating the current, so that the exact magnetic traction can be obtained for the material under treatment. A double pole switch, with a cutout to protect the coils in case of short circuit, is also furnished.

The machines are well built and are very much stronger and more durable than the ordinary separator in common use. There are no brushes or contact pieces of any kind about the machine. The wires lead directly into and form part of the exciting coils, and there are no trappy connections to give trouble. The separator is strong and simple, not likely to get out of order, and,

Notes from Great Britain.

LONDON, June 5, 1905.—Business seems to be slightly gathering strength, but on the whole things are quiet. Between now and the end of the quarter a great many contracts fall in, and interesting developments may be expected. It looks as though contracts would be placed at a higher level, as German material is not available on easier terms. Sectional steel is in large demand, but the prices remain stationary.

The German Steel Trust and the Middleman.

A good deal of interest is being taken both in this country and Germany in the latest development of the German Steel Association in Great Britain. It is frankly admitted that the circular addressed by the London agency of the Steel Association to manufacturers of finished goods in the United Kingdom, requesting them in future to deal directly with the agency, is a determined attempt to eliminate British middlemen from German dealings in the British market. The German trust has

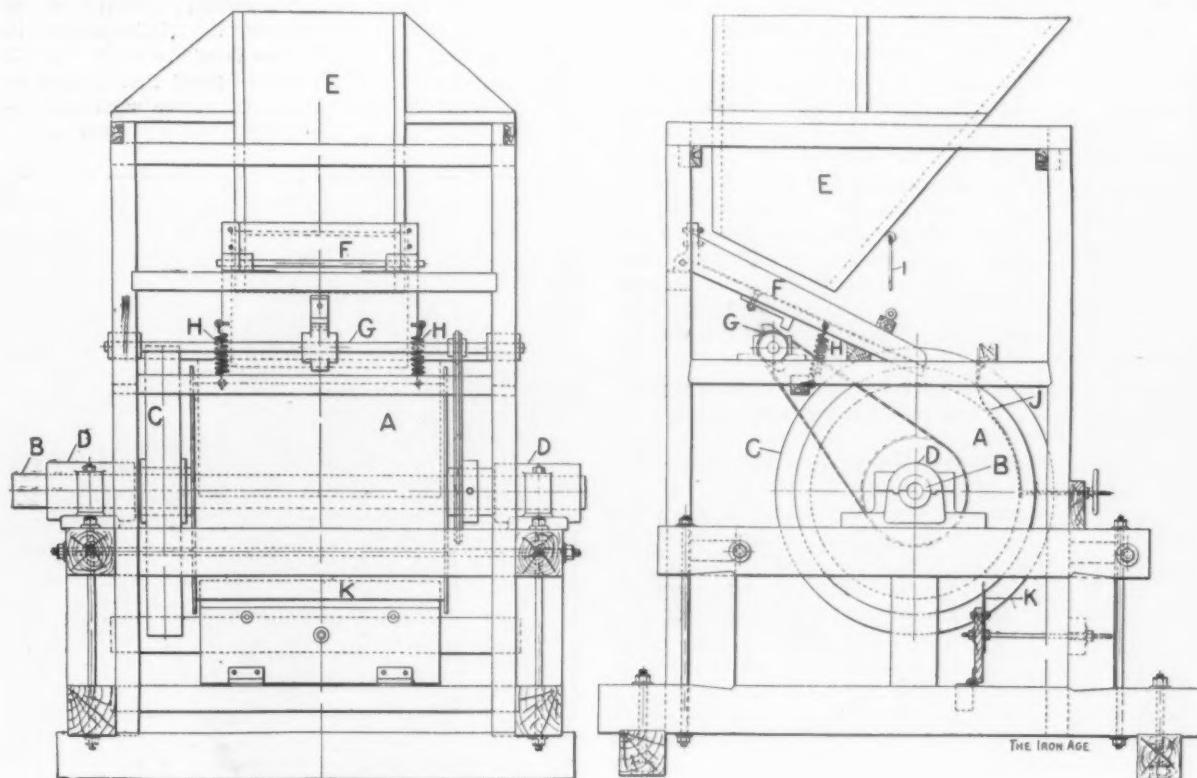


Fig. 2.—Side and End Elevations of a Buchanan Magnetic Separator for Removing Iron from Miscellaneous Scrap.

having a uniform and powerful magnetic field, it will do excellent work. As there is no waste space on the separating side of the drum, the machine has a large capacity.

The separator is manufactured by the George V. Cresson Company, Philadelphia and New York, and is the invention of C. C. Buchanan, consulting engineer to the above company at its New York office, 141 Liberty street.

At the regular monthly meeting of the Board of Directors of the Maritime Association of the port of New York, held last week, a proposition was made to arrange an international celebration of the one hundredth anniversary of Robert Fulton's invention and successful inauguration of steam navigation during the summer of 1807.

The pipe bending machine illustrated in *The Iron Age* January 5, 1905, as then made by Pedrick & Smith, Philadelphia, will henceforth be manufactured by the Chicago Pneumatic Tool Company, Chicago, Ill., which company now owns the patent rights.

definitely broken with the traditional custom of quoting its goods for export to Great Britain f.o.b. It declares that in future its offers will be c.i.f. and will be made known in British ports. I need only remark that stronger combinations than the German Association have unsuccessfully tried a fall with the British middleman. My impression is that, notwithstanding all the recent organization of the iron and steel industry, the middleman remains as strong as ever.

A Welsh Tin Plate Combine.

The chief tin plate bar makers of South Wales, finding that owing to the undercutting which has been going on it has been impossible for the past year or so to run their works with any margin of profit, recently met at Swansea and decided to form an association for the purpose of fixing some consistent price for the commodity they manufacture, and of discussing matters of interest to their trade from time to time. The meeting was a fully representative one, and the makers profess no doubt that for the future the prices they fix will be adhered to.

Russian Ore.

The enhancement of the price of high-class Rubio ore, created by an excess of demand over output, is caus-

ing West Cumberland steel makers to turn their eyes from Spain to the newer and extensive ore fields of Russia. The result of a trial of a sample of 500 tons of Russian ore has encouraged Cammell, Laird & Co. to enter into a contract for their furnaces at Maryport and Workington. The first consignment of 2500 tons arrived at Maryport from Narvik last week, and 10,000 tons more are to follow. This Russian ore is reported to be of an exceptionally high grade, rich in iron, and specially free from detrimental elements, which, with its reasonable price, highly commends it as a substitute for the very best Spanish ore.

The New Parkgate Blast Furnaces.

The new blast furnace plant of the Parkgate Iron & Steel Company, Limited, Rotherham, was successfully started this week. The plant consists of two blast furnaces, with the necessary Cowper stoves, with a Gjers & Harrison equalizer between the furnaces and stoves, is of the most modern type and embodies all that is known of the best practice of this country, America and the Continent. In addition, there are many novel features which it is believed are improvements on existing methods.

The stoves are, of course, heated by the waste gases of the furnaces, and these waste gases are also employed for driving the blowing engines—gas engines of the Kortting type. Material is fed into the furnaces automatically, the coke, ore, &c., being shot into a skip at the bottom of an inclined hoist. The skips are elevated by an electric winding engine, automatically stopped at the proper place at the top of the furnace and tipped into the distributing hopper. This hopper drops the charge on any part of the bell that may be desired. When fully charged the bell, which is also operated electrically, is lowered, and after discharging its load rises automatically to its place again, remaining in position until it is necessary to lower another charge into the furnace. Sounding rods are provided on the furnace top, by lowering which the depth at which the metal stands below the bell can be readily ascertained.

All these operations—hoisting, tipping, distributing, lowering the bell and sounding for the depth of the charge—are performed by one man stationed in the weigh house near the foot of the incline. He has convenient to him a series of electric switches, and in front of him in a glass case there is a miniature presentation of the top of the blast furnace, so that when he actuates a switch, say, for the purpose of lowering the bell, he sees the metal bell in front of him fall and rise in the same way and at the same time as the bell does at the top of the furnace. Similarly, when he turns the switch lowering the sounding rods the miniature sounding rods before him are also lowered and indicate on a scale the number of feet at which the charge stands below the bell. In fact, except for the necessary operations of bringing forward raw material and tapping the molten iron, the furnaces are practically automatic.

The gas and chimney valves are of a new type, and have been arranged not only for facility of operations, but to prevent leakage. The dust catchers are specially designed to give very complete dust separation. The gas mains also contain further dust separators and scrapers, which continually remove the dust while the furnace is in operation. A further cleansing of the proportion of gas which goes to the gas engine is effected by washing and scrubbing, until it contains rather less gas in suspension than the atmosphere we breathe. It is ultimately intended to take the molten metal direct to the steel furnaces, and preparations are being made with this object in view.

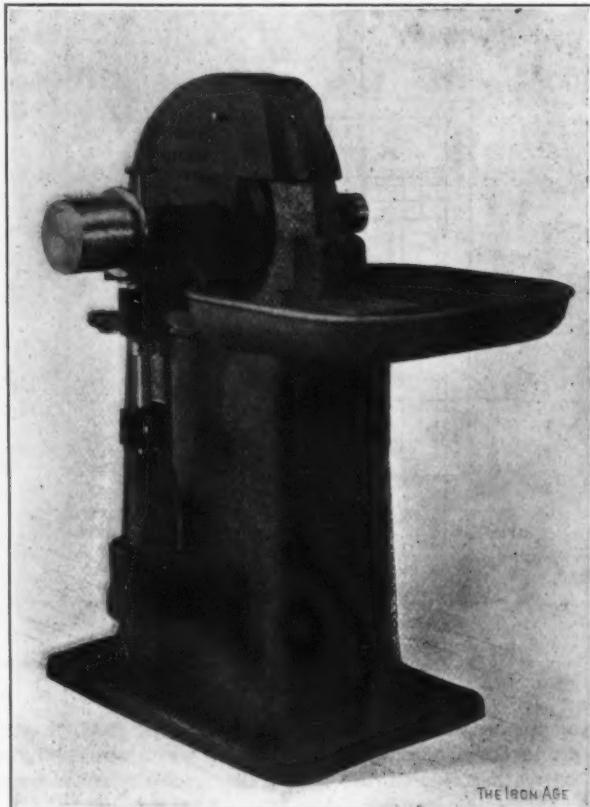
S. G. H.

That a lockout is as legal as a peaceable strike is the gist of a recent decision by Judge Clarke of the Supreme Court of Pennsylvania in the case of the City Trust Safe Deposit & Security Company of Philadelphia *vs.* Waldhauer, which was an outcome of the general lockout ordered by the Building Trades Employers' Association of Philadelphia in 1903. Waldhauer and another member, after locking out their men, re-employed them, and were expelled from the association, whereupon the Security

Company paid their bonds of \$500 each. As the two ex-members refused to indemnify the company on their bonds, suit was brought against them. The defense was that the employers had no authority to order a lockout, and that it was in restraint of trade. The Court stated in the decision: "So far as restraint of trade is concerned, a lockout is no greater restraint of trade than a strike, and yet a strike is not unlawful."

The Blount Grinder.

The water tool grinder shown in the accompanying illustration has as an interesting feature a pumping mechanism to insure a constant supply of water to the wheel. A vertical centrifugal pump is employed, the pump shaft being driven by means of a friction pulley, which is held in contact with the edge of the main driving pulley and runs in self oiling bearings. Those bearings are above the water line and are thereby protected from all gritty substances that may be suspended in the water. They are mounted upon a forked carrier pivoted at its lower end, the upper end being secured between jaws that are provided with a spring to force the friction against the driven pulley. The pump case is of the snail shell design, and the pump is so loosely fitted that it does not touch the case at any point, and coarse sand can pass through it without injury. The case is set low and is



THE IRON AGE

The Blount Grinder.

provided with a large passage for the water to flow from the tank to the column. A sleeve cap covers the pump case and prevents leakage without the use of packing, the water line always being below the top of the sleeve. A large deep pan is set below the wheel and extends from the front to the back of the column to catch and prevent dirt or grit from settling in the tank. The water from the pan passes to the tank below at the farthest possible point from the pump. The tank is provided with a settling chamber to catch and retain any grit that may pass the pan. There is a large opening at the side of the tank through which it may be cleaned. The grinder is designed for wheels 20 inches in diameter and 2½-inch face. The machine has long self oiling bearings and is of heavy construction to avoid vibration. It is built by the J. G. Blount Company, Everett, Mass.

Care and Storage of Patterns.*

BY H. M. LANE.

One of the most serious problems that confront any manufacturing concern is the storage of patterns and the keeping of records for the same. If the concern uses metal patterns entirely the storage can be much simplified, as the metal patterns can be easily protected against fire loss, and hence the storage of this class of patterns will be considered first.

Metal patterns are as a rule of comparatively small size. Very small or thin patterns, which are used in connection with match plates, can be stored in fire proof vaults or rooms. Very frequently, however, wooden shelving is used in such vaults, though when possible it is always to be avoided. Very strong and not exceedingly expensive shelving can be made up from light angle iron and sheet iron. It is needless to say that the pattern vault should always be kept dry for the protection of patterns, and under such conditions the iron shelves and supports would last almost indefinitely. A vault of this kind having fire proof walls, roof and door, and provided with metal shelving, is undoubtedly the best possible arrangement. To cheapen the arrangement somewhat many have substituted wooden shelving for metal shelving. If the vault is thoroughly fire proof and there is no opportunity for the shelving to be set on fire such a vault is certainly very valuable and it is probable that the risk of fire from the shelving is almost a negligible factor.

To reduce still further the cost of the storage some manufacturers provide a building apart from the other structures and arranged with no windows in the side walls. The shelving is of wood and the roof of some slow burning construction, usually covered with slate or metal. Light is obtained from skylights in the roof. Such an arrangement as this is undoubtedly a great protection, but care should be taken not to store combustible materials in the vault, such as alcohol or gasoline, as the ignition of a can of such material might destroy the contents of a vault in a very short time. If no such building is provided for the metal patterns the storage shelves should be so arranged that they can be readily protected by a fire fighting apparatus, and they should also be located in some part of the plant where the fire risk is a minimum.

As a rule where metal patterns are used in stove plate, hardware and similar factories the patterns with their matches do not take up much space, and hence a very large number can be stored in a comparatively small space. Where special molding machines equipped with large patterns are used it becomes necessary to provide stronger and larger shelving, and in some cases the large pieces must be kept on the floor of the storage building.

In the storage of wood patterns several factors enter to complicate the problem. First, the patterns themselves are highly inflammable; second, wood patterns are usually very much more bulky than metal patterns, and hence require larger space in the storage; third, wood patterns absorb moisture during molding to a greater or less extent, and if they are then placed in a cold storage room in the winter moisture freezes and injures the joints and surface of the pattern, and hence a pattern storage for wood patterns should be provided with some heating system. It is also necessary to heat the metal pattern storage for the benefit of the man who takes care of the patterns, as no man can do work in a cold room.

Protection Against Fire.

In the case of wood patterns all that can be done in the construction is to minimize fire risk. Among the methods of construction to reduce fire risk the following may be considered: First, there are the individual room and the individual vault systems. In the former ordinary pattern shelving is used. The rooms are provided with fire proof floors; the windows, if any, with fire proof shutters, and the doors with self closing fire proof doors. These doors

are held open with cords and fusible plugs or couplings, which would be released very quickly if exposed to any heat. The object in this system is to prevent fire spreading through the entire storage and as far as possible to smother the fire in the compartment in which it breaks out. This system is generally used in connection with the sprinkler system. Of necessity the pattern shelving is not very high in such storage room, on account of the fact that the patterns are all placed in position by hand from short ladders, and hence the individual units are rooms from 60 to 100 or more feet in length, usually from 60 to 80 or more feet wide and from 15 to 20 feet in height.

In the other system the individual rooms or units are made narrow but very high; a crane is used for placing the patterns into or taking them from the storage, the crane being arranged to travel over the entire room, so that the operator may carry his cage or platform in between any of the sets of shelving, and thus reach any point of the storage system. Such rooms can be made practically air tight, the ventilators at the top being provided with covers suspended by fusible couplings, which are dropped at the least indication of fire. In this style of storage the sprinkler system would be of little avail.

In both the systems so far described every possible precaution is taken to enable those in charge to extinguish a fire should one start. Usually, however, these buildings are arranged for the use of artificial light, which in most cases is furnished by the use of incandescent lights. To minimize such fire risk and at the same time to reduce the labor of placing the patterns on or removing them from the shelving, at least one prominent manufacturer has constructed a pattern storage using slow burning mill construction and having a head room of not to exceed 8 feet, so that a man standing on the floor could reach any of the shelves. No artificial lights of any kind are allowed in the building and all patterns are taken into or out of the storage during the day.

In some cases the inflammable character of the material has been recognized and only a thin wooden roof of light construction used, the idea being that such a roof would burn off quickly and give free access to the fire for the firemen. A large number of pattern storages has been constructed one or two stories in height, without any outside windows—all of the light comes from a skylight—the idea being that the lower part of the building could be shut up tight and a fire smothered out. The particular form of construction depends largely upon the means of the company owning the plant, and it is often necessary to use the simplest kind of frame structure.

General Requirements.

No place about a manufactory gives such an opportunity to display fads or ride hobbies as in connection with the care and storage of patterns. There are a few points in connection with the subject, however, which may be called axioms.

First, no matter how many men are allowed to take patterns from the storage, only one man should be allowed to return them and he should be held responsible for every pattern.

Second, where only a limited number of small or medium sized patterns have to be cared for it is foolish to install any hoist or elevator system for handling patterns, as in most cases the attendant has ample leisure to put them away, and in many cases he can carry them upstairs cheaper than they could be taken up on an elevator, which would ordinarily stand idle 99 per cent. of the time.

Third, whatever system is in vogue, some provision must be made for taking care of the dead patterns; in other words, there must be a graveyard.

Fourth, wood patterns must never be stored where they are subject to rain or snow, or even where they are subject to freezing temperatures. The reason for the latter statement is that moisture in the surface of the pattern will be frozen and injure the surface or finish. This freezing will often open the joints.

* Read before the American Foundrymen's Association, New York, June, 1905.

An Interesting Steel Forge Decision.

A verdict rendered in the courts at Pittsburgh last week in favor of the Steel Car Forge Company, Pittsburgh, against the Pressed Steel Car Company is of considerable interest as showing the rights involved in long time contracts. The former company, according to the claims made, had secured a long term contract with the latter to supply it with all of the car forgings it required in the manufacture of steel cars. The contract was made about five years ago and has another five years to run.

At the time the contract was made the Pressed Steel Car Company owned most of the stock in the Steel Car Forge Company, which operates large works in Ellwood City, Pa. Since that time the majority of the stock has been secured by other interests, and, finally, it passed over to the control of the Standard Steel Car Company. When this was done the charge was made that the Pressed Steel Car Company began to make its own forgings and built a forge works in Allegheny, Pa., at a cost of \$200,000 to supply its needs.

The Steel Car Forge Company, being unable to secure any business from the Pressed Steel Car Company, brought suit for \$50,000 damages for nonfulfillment of contract, but the principal purpose was to get a court ruling on the contract that was held with the latter. For ten days evidence was heard and the jury deliberated for 24 hours over the case and then brought in a verdict for \$10 in favor of the Steel Car Forge Company. As a result of this decision, unless appealed, the Pressed Steel Car Company will have to close down its own forge works and buy its car forgings from the Standard Steel Car Company, which owns the Steel Car Forge Company. The amount of business that it means to the Forge Company is estimated at \$1,000,000 yearly.

An interesting case has been entered in Massachusetts in which the city of Haverhill seeks to stop the granting of a contract for the new Haverhill bridge across the Merrimack River. The price named by the lowest bidder was \$177,000, but after the sealed proposals had been opened a representative of another company, which had not entered the contest, offered to build the bridge for

The Carnegie Steel Cross Tie.

The Carnegie Steel Company, Pittsburgh, Pa., has for some time been furnishing prominent railroad companies with considerable quantities of steel cross ties. It is believed that the near future will witness material development in the use of metal ties to replace the wooden ones. Wooden ties are steadily growing scarcer and dearer. Herewith illustrations are given of the new tie which has been brought out by the Carnegie Steel Com-

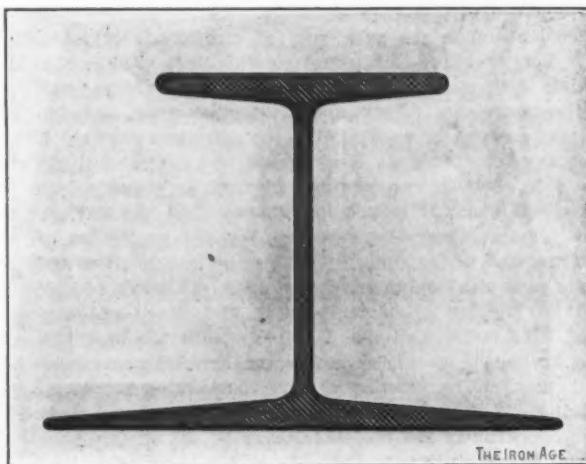


Fig. 1.—Cross Section of the Carnegie Steel Cross Tie.

pany, together with the method of its use. Fig. 1 is a cross section of the tie, which, it will be observed, is an exaggerated form of the well-known I-beam. This section combines ample bearing surface of a proper shape for bedding and tamping, sufficient surface for seating the rail, the greatest rigidity and transverse strength for a given weight of material, and an easy means for securing the rail to the tie. It has a top flange $4\frac{1}{2}$ inches wide, a bottom flange 8 inches wide, a depth of $5\frac{1}{2}$ inches, is 8 feet 6 inches in length, and weighs 19.7 pounds per foot, or a total weight of 167.4 pounds per

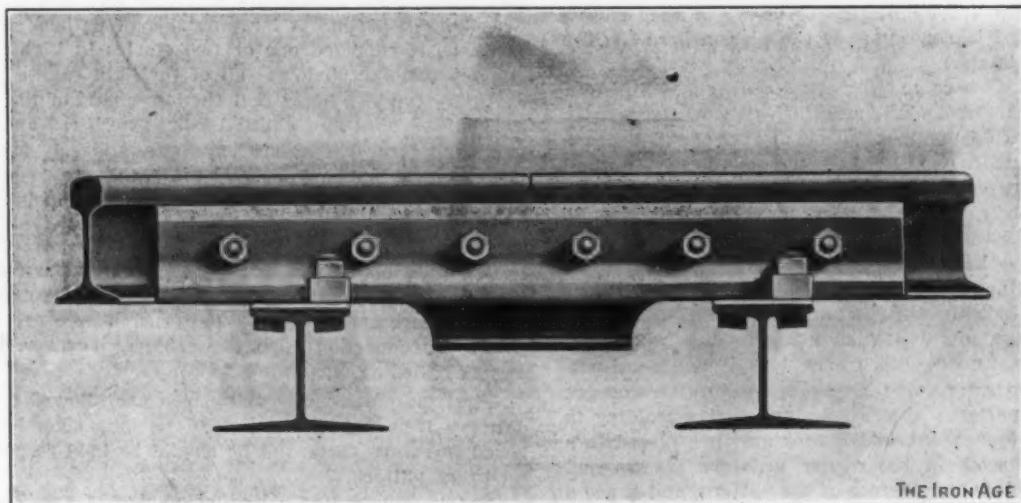


Fig. 2.—The Carnegie Steel Cross Tie as Applied at a Joint.

\$140,000, and gave a certified check for \$10,000 as a guarantee that the work would be satisfactorily accomplished. The county commissioners awarded the contract, on the basis of the sealed proposals, at \$177,000. The city of Haverhill, which pays 40 per cent. of the cost of the bridge, seeks to secure the lower bid. A temporary injunction was granted pending a hearing.

The Vanderbilt lines have acquired property a mile square at Gardenville, in the eastern outskirts of Buffalo, N. Y., upon which immense transfer and terminal yards will be constructed connecting the New York Central with the Lake Shore and Nickel Plate roads.

tie, exclusive of fastenings, which weigh about 6 pounds. The rail is secured to the tie, as shown in Figs. 2 and 3, with four $\frac{3}{4}$ -inch bolts, by means of rolled steel clips, fitting accurately on the flange of the rail. These clips have a bevel exactly the same as that of the flange of the rail and are carefully punched so that the shoulder of the clip gives proper and positive rail alignment. The necessary insulation, where automatic block signals are in use, is provided for by the use of wooden shims between the rail and the tie, fiber bushings around the bolts and fiber washers under the nuts.

These ties have been used in sufficient quantities to demonstrate their efficiency during the past two years.

on lines carrying fast and heavy traffic, as follows: Duluth & Iron Range Railroad, Bessemer & Lake Erie Railroad, New York Central & Hudson River Railroad, Lake Shore & Michigan Southern Railroad.

An order has just been placed by the Bessemer & Lake Erie Railroad with the Carnegie Steel Company for 10 miles of these ties, the order amounting to about 2100 tons. This order follows a test of a half mile of the Carnegie steel tie for the past six months. Arrangements are being made to have the tie used on the Pennsylvania Railroad near Emsworth, Pa.

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Special Commissioners to Develop Foreign Trade.

WASHINGTON, D. C., June 20, 1905.—The Secretary of Commerce and Labor is about to take action of much importance to domestic manufacturers and exporters in accordance with the authorization contained in one of

exporters to build up a large trade in certain lines, while equally energetic efforts to market other classes of merchandise have met with little or no success. Special attention will be given to an inquiry into the causes that have contributed to the success of our principal competitors in the markets in question, and all possible information on this point will be considered. In addition the Commissioners will report upon transportation routes, docking and warehouse facilities, banking systems, internal rail and water ways, and in the Orient a study will be made of the obstacles in the way of the prompt transit of goods to the interior, the overcoming of which frequently adds greatly to the cost of merchandise before it reaches its final destination. The Commissioners will be instructed to forward to the Department brief monthly reports and to prepare at least a general preliminary report for transmission to Congress in December.

Efforts of State Department.

The action of Congress in making an additional appropriation for the investigation of trade conditions abroad

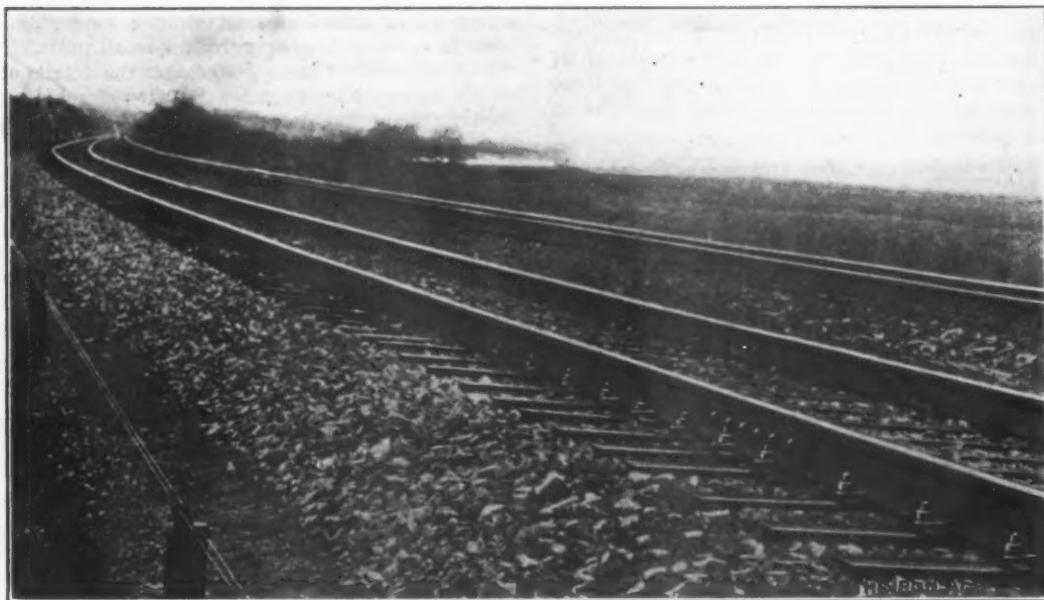


Fig. 3.—The Carnegie Steel Cross Tie Installed on the New York Central & Hudson River Railroad Near Castleton, N. Y.

the annual appropriation bills passed at the last session of Congress, as follows:

For compensation at not more than \$10 per day and actual necessary traveling expenses of special agents to investigate trade conditions abroad, with the object of promoting the foreign commerce of the United States, \$30,000; and the results of such investigation shall be reported to Congress.

Under the terms of this provision of law the Secretary will on July 1 dispatch five special agents, two of whom will visit the Orient, while the others will go to Central America, South America and the West Indies, respectively. The agents to be sent to the Orient will be Raymond F. Crist, who will be detailed from the office of the Secretary of Commerce and Labor, and Professor Hutchinson of the University of California. Charles M. Pepper, formerly a newspaper correspondent but more recently a special commissioner to investigate the practicability of an international railway through Central and South America, will be assigned to South America. The remaining appointments will be announced in a few days.

Agents of Bureau of Manufactures.

The Commissioners will be attached to the Bureau of Manufactures in accordance with the terms of the act creating the Department of Commerce and Labor. While the instructions of these special agents have not been prepared, they have been briefly outlined by the Secretary and the Chief of the Bureau of Manufactures. They will be directed to make a careful investigation of the conditions that have made it possible for American

is due in a considerable degree to the earnest efforts of the State Department to secure authority for the appointment of commercial attachés as an auxiliary staff to the diplomatic and consular service. The subject has been agitated for several years and at the last session of Congress was formulated by Assistant Secretary of State Loomis into a specific recommendation for an appropriation of \$50,000 to cover salaries and expenses of six agents with the diplomatic rank and title of commercial attaché "to prepare for the Department of Commerce and Labor reports upon commerce and manufactures, or upon kindred topics, of a more exhaustive and comprehensive character than is ordinarily obtainable at present," &c.

Independence of Commissioners Essential.

The recommendations of the State Department were favorably received in Congress, but the suggestion was made that the proposed staff of commercial experts would be able to work to better advantage if attached to the Department of Commerce and Labor. The necessity under which the diplomatic and consular service labors of maintaining the best possible relations with the Governments to which its members are accredited is frequently embarrassing in connection with commercial investigations, and it is therefore believed that an independent staff reporting to the commercial department of the Government of the United States will be able to accomplish the best results.

W. L. C.

Large German Gas Engines.—I.

The following is an abstract of an address delivered before the Society of German Engineers by Professor Riedler, who describes and criticises the principal makes of large gas engines built in Germany, and gives also a short history of internal combustion engines in general. He begins by stating that in designing large engines more attention must be given to the engine builder's and operator's standpoint, not as is the usual practice, deciding everything solely with the object of economy in transforming heat into mechanical energy, which leads to contradictory requirements. Purely scientific questions should be deferred until the gas engine is more fully developed mechanically, as was the case with the steam engine. Compared with the latter gas engines are still in their infancy, their development for industrial purposes having taken place almost entirely within the last 30 years.

Engines Without Compression.

The first gas engine was that of Lenoir, whose invention, brought out about 1860, was a complete failure. A few years later it was followed by the flying piston engine of Otto, which, although mechanically very imperfect, showed the very low coal gas consumption of 27 cubic feet per horse-power hour. A great many of these machines were built in the seventies, when there was no other form of small motor available.

Otto's Four-Cycle System.

The most important advance yet made in the development of internal combustion engines was the compression of the explosive mixture before ignition. It was at first regarded as a backward step, owing to the fact that there is but one impulse for every two revolutions of the engine. The numerous advantages, such as the great expansion, the full working diagram, &c., were scarcely noticed. Comparisons were made with double acting steam engines actuated by four impulses per revolution, a superficial criticism, which is, however, still often heard.

The four-cycle system and the arrangement whereby the cylinder acts as a compressor are in many respects quite ideal and, from a thermo dynamic as well as a mechanical point of view, hard to beat. It avoids the use of a separate compressor, it has fewer valves, the stress on the working parts is applied gradually, and the high piston speed results in good utilization of the heat. The work expended in compression is not lost, being immediately regained in the working stroke, while the fact that the explosive mixture is compressed in the working cylinder avoids the necessity of passing the same through pumps, passages, valves, &c., and overcoming the resistance of each.

One of the principal advantages of compression, especially with large engines, is that by it alone is it possible to use a poor gas which otherwise would not ignite. Even the fact that only one impulse is given for every two revolutions of the engine is not altogether disadvantageous, as it aids in keeping cool the cylinder. The advance which the four-cycle system represents, however, is due almost entirely to the compression of the explosive mixture. The degree of compression was at first about 30 pounds per square inch, which has been gradually increased until now it is 120 to 150 pounds. The working pressure after ignition has in the same period risen from 120 pounds to as high as 450 pounds for the poorer kinds of gas. Most of the objections raised against the system are not inherent in the same, but apply to single acting one-cylinder engines only.

The Two-Cycle System.

The so-called two-cycle system is really only a constructive change of the four-cycle, made with the object of obtaining a working stroke at each revolution in order to better utilize the working parts and obtain double the power without increasing the size. This is attained by clearing the products of combustion from the cylinder and charging the same anew with explosive mixture by means of a pump. The difficulties connected with this operation are many, chiefly owing to the short time available for exhausting, clearing and charging, and the necessity of

keeping separate the burnt gases, the clearing air and the explosive mixture. Owing to the limited time a high pressure must be used, and this is unfavorable to the separation above mentioned and results in much power being absorbed by the pumps. The correct regulation of the explosive mixture is also a difficult matter. While the Otto patents were still in force numerous forms of two-cycle engines made their appearance, the chief difference between them being in the means used for clearing and charging.

Four-Cycle Engines.

The constructive details used in small gas engines have seldom proved suitable for those of larger power, and it is in a great measure owing to a failure to grasp this fact that many large engines have not been successful. Especially unsuitable were the open, uncooled pistons and the inaccessible arrangement of the cross head guides within the cylinder, the working surfaces of which being thereby subjected to the pressure of the cross head. While the constructive details used in small engines were often wrongfully regarded as valuable experience, many steps forward were held to be impossible owing to a few failures. Under this heading may be mentioned double acting water cooled pistons, stuffing boxes, &c., which were in any case too expensive for small units. Thus in the development of large gas engines the details of smaller gas engines have been imitated too closely instead of working along the lines of the steam engine. Most engines having more than one cylinder were held down to 250 horse-power for each, this being regarded as the limit. Thus 1000 horse-power engines were constructed with four working cylinders in the form shown in Fig. 1, an un-

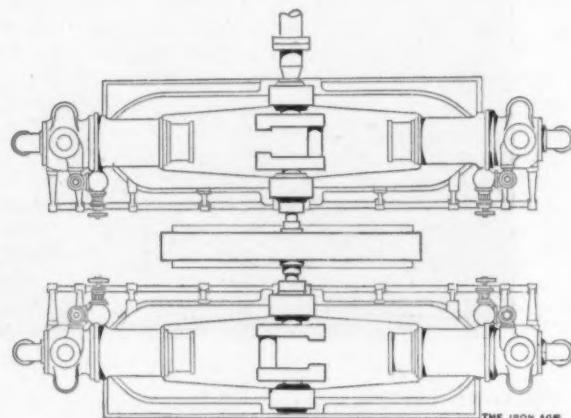


Fig. 1.—Four-Cylinder Gas Engine (Deutz).

suitable arrangement, which simply built up a large engine from the elements of a small one, thereby retaining all the disadvantages of the latter.

Large gas engines which were designed in this manner, by merely imitating the details of small ones, were as a rule especially faulty in the general mechanical arrangement. Details also which were not peculiar to internal combustion engines often showed defects which were opposed to the general principles of engine construction. Especially great were the faults committed in the important matters of reliability and accessibility. That which might be called "not good" in a small engine became a serious defect in a large one. This explains the fact that in the development of the latter it has often happened that purely mechanical improvements have often proved of the greatest value simply by the avoidance of the errors of the builders of small engines.

A notable example of this is the engine turned out by the Cockerill Company of Seraing, which uses Delamare's construction, which does not show any special thermo-dynamic developments. This firm, however, boldly built engines with one single acting cylinder, thus disposing of the fallacy that a cylinder giving more than 250 horse-power was impractical. A similar instance is the Westinghouse engine, which likewise, from a thermo-dynamic point of view, does not offer anything especially novel, but which is carried out in a convenient vertical form

with either two or three cylinders, use being made of the experience gained from the high speed steam engines built by the same firm.

The four-cycle system is, irrespective of details, the simplest and most natural, because the preparation for combustion—*i. e.*, loading and compression—is carried out with the most simple means possible. Unfortunately, many who should know better often regard the one-cylinder single acting engine as alone representative of the system. This type is, however, unsuitable for large powers, as the excessive dimensions and weights make it too expensive. As the size increases some of the parts become impossible to manufacture, and for all sizes the utilization of working parts is not economical.

The double acting cylinder, working on the four-cycle system both sides of the piston, is the correct basis for construction. It necessitates, however, a water cooled piston and stuffing box and details differing materially from those used in small engines. Such an arrangement at once removes the greatest disadvantage of the single acting cylinder—*i. e.*, the imperfect utilization of the working parts. Two such double acting cylinders in tandem connected to the same crank shaft effect the maximum economy in this direction and yield the highest possible efficiency, such as cannot be surpassed or even reached by two-cycle engines. All the usual objections to the system—namely, that the mechanical efficiency is low, that the power is irregular, that the weight is excessive, that the dimensions of the cylinder must be limited, that the exhaust valves are useless, &c.—completely disappear when double acting cylinders and correct construction are made use of.

However, conceding that the double acting four-cycle cylinder is the simplest and most suitable basis for the construction of large gas engines, it does not follow that all engines of this type are satisfactory. For medium powers such engines have been built for many years, often with unsatisfactory results. The failures have been due, however, not to the type, but to other causes. They have, nevertheless, delayed development along these lines. On account of the necessary cross head and guides double acting engines are more complicated than those of the single acting open piston type, and in the days of small engines were decried as too expensive. The exhaust valves were generally inaccessible, especially the front one, and the inevitable stuffing box was generally badly constructed and insufficiently cooled. This, too, was true of the piston rod, and the consequent failure of the piston rod packing was alone sufficient to render such engines unreliable or useless.

The well-known gas engine works at Deutz builds an engine of this type, shown in Fig. 2. The forward ex-

type could only be carried out by breaking completely away from the methods of builders of small engines both as regards general arrangement and details. This has now been done by the Nuremberg Machine Works, but before describing its engine it will be well to discuss the principal types of two-cycle engines.

Two-Cycle Engines.

The two-cycle system and the practical examples of the same are generally judged together, much being thereby pushed to the foreground which concerns only constructive details and not the system itself. Judgment usually begins with the assumption that the two-cycle system and two-cycle engines possess advantages over all others, the principal being smaller working stresses, lighter construction, smaller dimensions of the engines and their parts, greater uniformity, greater mechanical efficiency and lower cost. Important in engines of this system are first of all numerous purely constructive questions. As clearing and charging must take place in an extremely small period of time near the end of the stroke it becomes impracticable to take care of the exhaust by means of mushroom valves. To do so would lead to valve areas impossible in practice or rates of flow greater than permissible. It is often very difficult, especially at high speed, to construct even inlet valves which are satisfactory, and the lack of recognition of this fact has caused many failures. Since such valves cannot be used the only alternative is a ring of ports in the cylinder, which alone will give the large area necessary. It is not only the burnt gas which must pass through the exhaust, but also the air used in clearing the cylinder, while only about one-eighteenth the time is available as in the case of four-cycle engines.

To provide for the necessary fall in pressure the exhaust valve thus needs four times the area, causing great constructive difficulties, or the rate of flow must be four times as great, which is inadmissible. It is often stated that the exhaust valve of the four-cycle engines is a bad feature of the same which must be removed and replaced by annular ports. It is, however, not the exhaust valve which is bad, but its application to the two-cycle engine on account of the short amount of time available for its use. This forces engine builders to use ring ports, opened and closed by the piston, which arrangement has indeed many minor advantages.

The most important point, however, in the construction of engines of this kind is the charging mechanism, including the arrangement and details of the pumps and the relationship between the latter and the operating mechanism of the engine, which includes the valves. If the pumps cannot be so constructed that they use less than 10 per cent. of the indicated work of the engine it

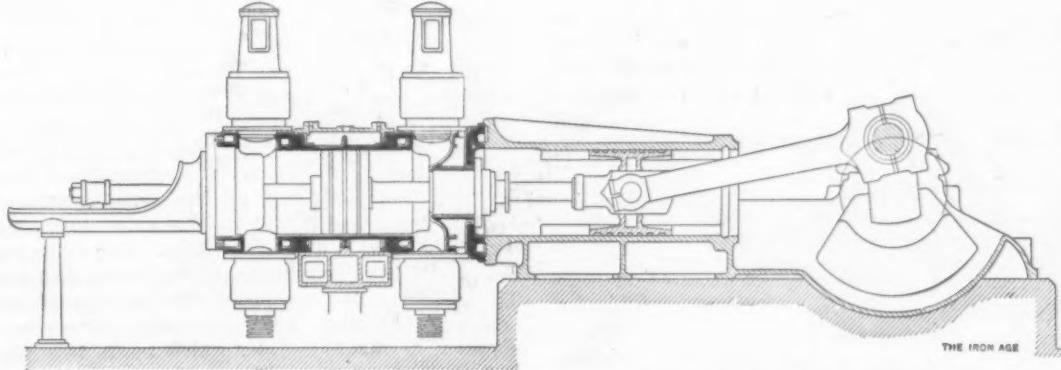


Fig. 2.—Four-Cycle Gas Engine with Double Acting Cylinder.

haust valve can be reached only from below, and that unhandily. A novelty on this engine is the arrangement of the water jacket and the engine bed, which contains all the pipe connections. The expansion of the cylinder inside the jacket is provided for, but the general construction of the same is not such as to preclude fracture if large engines of this type should be built, which has not yet been the case. The successful development of this

is impossible to build a two-cycle engine which will be as economical as the least efficient four-cycle machine—*i. e.*, the single acting one-cylinder type—the efficiency of which only amounts to 72 per cent. As, however, the latter are never used for large powers, but only double acting machines with more than one cylinder, the efficiency of which is over 85 per cent., it is necessary to so construct the pumps that they use considerably less

power than mentioned above. At the same time the cost of the pumps must be kept down, as otherwise the engine will be considerably more expensive than a four-cycle of the same power.

As the clearing and charging pumps are the weak point, or necessary evil, of the two-cycle engine, their construction should be as simple as possible. Various means have been suggested for this purpose, one of the same being to unite the clearing and charging pumps and to clear the cylinder with explosive mixture instead of air, but this is impracticable on account of the danger of explosion in the passage and pumps, and all attempts in this direction have failed. Another method is to have separate pumps for clearing and charging, but to use one set for several engines, which is not, however, satisfactory on account of the resistance in the pipes and the low efficiency of separately driven pumps. Still another method is to utilize an outside source for clearing the cylinder—for instance, the blast from furnace engines. This method is convenient, but if the cost of producing the blast is taken into consideration there can be no real economy in the same, and it can only be used in special cases.

Since the above mentioned methods cannot be used there is nothing left but to build pumps for each engine and use the same for measuring the gas and governing the speed, and by careful construction to take care that the cost and resistance are as low and the accessibility and reliability as complete as possible. For the sake of simplicity and cheapness the pumps are often built under the floor, either vertical, as shown in Fig. 3, or horizontal,

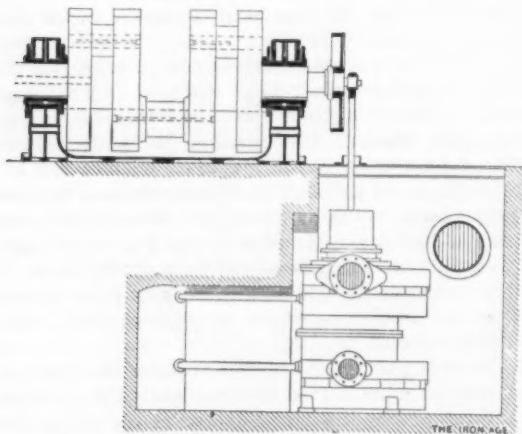


Fig. 3.—Vertical Charging Pumps Below the Floor.

as in Fig. 4. These methods, however, detract considerably from the accessibility. In the effort to build the pumps as cheaply as possible it has often happened that the same are very defective, cases having occurred in which they use 50 per cent. of the indicated work of the engine. In reports and criticisms hitherto published on the two-cycle engine but little attention is given to

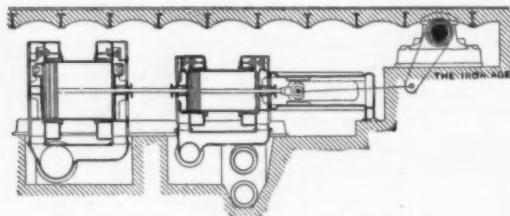


Fig. 4.—Air and Gas Pumps Below the Floor.

this feature. Regarded from a purely mechanical standpoint, as air compressors, most pumps hitherto built have been defective, a defect which concerns a very vital part.

The basic idea of the two-cycle engine is very simple—*i. e.*, to replace the exhaust and intake stroke of the four-cycle system by means of a special pump—but to carry out the same involves an extremely difficult problem which has not to date been completely solved. This is, to so construct the pumps that their resistance shall not consume all the advantage, but shall permit the power

produced to be greater and the cost less than in the four-cycle engine.

Completely subordinate to the above, other constructive details which do not directly concern the clearing and charging of the engine should be considered for the purpose of ascertaining whether their advantages are sufficient to counterbalance the undoubted disadvantages of the pumps. This can best be done by a detailed examination of the most successful engines of this type. If the inlet and exhaust are formed by ring ports the

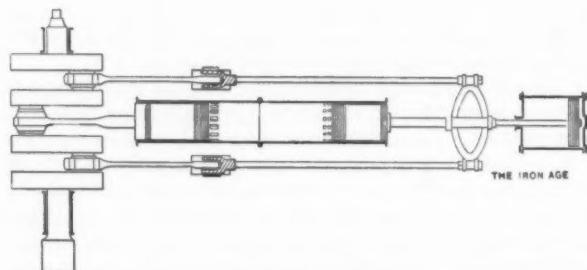


Fig. 5.—Two-Cycle Engine (Oechelhaeuser).

mushroom valves are replaced by openings in the cylinder.

This construction forces the use of double acting pistons, as in Fig. 5, which shows the general arrangement of the Oechelhaeuser two-cycle engines. Any other arrangement would be impracticable or very complicated, but that shown offers considerable advantages. The clearing air and explosive mixture remain separate, which leads to a high thermo-dynamic efficiency, and the simple form of the interior of the cylinder affords a very favorable combustion chamber. On the other hand, the moving parts become considerably more complicated, although they can be balanced very effectively.

The contention that such pistons give the power of single pistons working at double the speed is clearly wrong, however. Two-cycle engines with valves operated in this manner have been successfully developed by Oechelhaeuser. Originally the ring ports were only used for exhaust and for the clearing air, the same being closed when the cylinder was cleared and the gas being forced during the combustion stroke through a special valve. These engines were constructed for a coal gas, which was forced in by a pump which had to work at a pressure of from 150 to 180 pounds.

In the present Oechelhaeuser engines the fuel is introduced at about 5 pounds pressure, not during the combustion stroke, but after the cylinder is cleared, as nearly as possible at the dead point. The result is that combustion takes place in the working cylinder only and not in the gas pump. The high pressure gas pump formerly used had to be placed as near as possible to the working cylinder in order to diminish the loss in transferring the gas, and was usually placed at the side in order that one of the rods of the rear driving mechanism could serve at the same time as the pump rod.

The present arrangement allows greater freedom in location, thereby adding to the accessibility of the cylinder and the simplicity of the general arrangement. Another advantage is that the gas valve, with its operating mechanism, is done away with. The older construction would have been quite impracticable with poor gas. The contention is often heard that the simplicity of this arrangement makes the "valveless" two-cycle engine superior to the four-cycle, which needs two valves on each end of the cylinder, but this description is incorrect, for the two pistons and the ring ports are, as a matter of fact, valves.

A peculiarity of this operating mechanism is that the relative positions of the ring ports and pistons are fixed, and it is therefore impossible to regulate the speed by adjustment of the same. Furthermore, the operating mechanism of the pumps is a part of the engine, although outside of the working cylinder. The necessary governing mechanism is, therefore, transferred to other parts—*i. e.*, the pump valves—while in four-cycle engines the same is taken care of by the inlet and outlet valves. The

operating mechanism of such engines consists, therefore, of three ring ports for exhaust, air and gas, two piston valves, which are also the working pistons, and the numerous valves of the pumps. There is also a governing valve over each ring of inlet ports and a positive valve before each inlet. There are, therefore, really more working parts than in the double acting four-cycle engine of the same power, so that from the engine builder's point of view the possible saving is not great.

Premature ignition cannot be avoided in any kind of two-cycle engine. The causes of the same are heated parts and sparks left after combustion. These will occur with two-cycle as well as with four-cycle engines and their effects will be chiefly felt during compression, which in all engines takes place in the cylinder. In the two-cycle process compression follows immediately after the working stroke, while in the four-cycle the cooling effect of the suction stroke is interposed.

(To be continued.)

Prospects for Reciprocity with Germany.

WASHINGTON, D. C., June 20, 1905.—The possibility of protecting at least a portion of our exports to Germany from the disastrous effect of the application of the maximum rates of the new German tariff has been suggested here within the past few days as the result of the examination by certain officials of the Administration of the terms of the minor reciprocal commercial arrangement concluded with Germany July 10, 1900, under Section 3 of the Dingley tariff act. By the terms of this arrangement the United States granted certain reductions in duties upon crude tartar, brandies, still wines, vermouth and works of art of all kinds. In consideration of these reductions Germany guaranteed to the United States the minimum rates of her existing tariff in the following terms:

Reciprocally the Imperial German Government guarantees to the products of the United States on their entry into Germany the tariff rates which have been conceded by the commercial treaties concluded during the years 1891-1894 between Germany on the one part, and Belgium, Italy, Austria-Hungary, Roumania, Russia, Switzerland and Servia on the other part.

Congressional Approval Necessary.

Inasmuch as Germany now proposes to deny to American products the minimum rates of her new tariff, which it must be admitted far outweigh the advantages accorded by this minor convention to German products, the denunciation of this treaty by the United States will promptly follow unless Germany makes important concessions with a view to keeping the convention alive. It is in this connection that the State Department will be able, without the intervention of Congress, to make an agreement with Germany by which a part of our exports will receive the most favored nation treatment. The fact that the concessions to be made to Germany have already been authorized by Congress and are set forth in the treaty above quoted will obviate the necessity of calling upon Congress to approve the changes, which will embrace merely the substitution of new concessions on the part of Germany for those above specified.

While at first glance it may appear that Germany can hardly be induced to give much in exchange for the reductions made by the United States in this minor commercial arrangement, yet it should be remembered that Germany's exports to this country of the articles enumerated are very large and constantly increasing. It should also be borne in mind that the United States grants similar concessions on the same classes of merchandise imported from France, which would mean of course that Germany would lose every dollar's worth of this trade if this arrangement should be denounced. It is also significant in this connection that when the United States made the concessions on argols, brandies, wines, works of art, &c., we obtained in exchange the minimum rates of the French tariff on numerous American products, including petroleum, lumber, meat products, fruits, &c. It may be assumed that Germany would grant quite as much to continue the minor convention in force, and it would seem to remain for the representatives of the leading domestic industries to inform the State Department

as to their needs with respect to special concessions if it is found to be impracticable to conclude a general and comprehensive treaty.

That the alternative arrangement herein suggested is being considered in Berlin as well as in Washington is evidenced by the cabled announcement that the Düsseldorf Chamber of Commerce has submitted a memorial to Prince von Buelow suggesting that "some alleviation to the export business of each country could be secured by the United States continuing the lower rate of duties on German goods in the list provided for by the Saratoga agreement, to which Germany would answer with equivalent compensations, but not with treaty rates throughout as conceded to other countries."

Anxiety as to Retaliation Schemes.

Representatives of important exporting interests are making a careful investigation here to ascertain the basis of the statement recently made by Secretary Shaw that a bill is being prepared providing for the assessment of retaliatory duties upon the products of all countries that refuse to accord to the United States the benefits of the minimum rates of their several tariffs. Several members of the Finance and Ways and Means committees have visited Washington within the past fortnight, but all deny any knowledge of such a measure, and all express with considerable emphasis the opinion that it would be an exceedingly ill advised step for the American Congress to take.

Up to the present time no evidence has been discovered indicating that those who are responsible for the tariff legislation of Congress seriously contemplate enacting such a measure as has been referred to. One strong reason why such a policy is opposed by the most experienced legislators is the fact that Germany has already provided a method of meeting reprisals that is so drastic that it would certainly precipitate a protracted tariff war, the results of which cannot even be estimated. The special precautions taken by the German Government to meet such a movement are well understood here by those who have made a study of the international policies of the leading European countries. One of the closest students of the present situation is N. I. Stone, the tariff expert of the Bureau of Statistics of the Department of Commerce and Labor. Mr. Stone's effort is to get at the facts without regard to political considerations, and his presentations can be relied upon as being made without the slightest prejudice. In a memorandum with regard to this interesting subject, he says:

What with our refusal to give the most favored nation clause the same sweeping interpretation as Germany has been insisting on so far, and our repeated assertions that the old treaty with Prussia does not necessarily apply to the entire German Empire, Germany has ample ground, from her point of view, for denouncing the old treaty and subjecting our goods to the rates provided for in her new general tariff. Should we resort to reprisals or even should we grant to any nation more favorable terms than to Germany under our construction of the most favored nation clause, the German Government is authorized by section 10 of the new tariff law to have our goods "burdened with a surtax ranging to 100 per cent. of the tariff duty imposed on such goods, or even with a surtax equivalent to the total value of the goods themselves. Goods free of duty by virtue of the tariff may, under the same conditions, be taxed with a duty not exceeding 50 per cent. ad valorem." Such are the serious possibilities hidden in the present German-American trade relations, which are apt to reach a critical stage as soon as Germany has concluded new treaties with her neighbors and denounced the treaties now in force.

Conservative public men here who are unanimously opposed to any general policy of retaliation recall the fact that when the French Government adopted its present tariff, under which at the outset we were compelled to pay maximum rates on all our products, a demand went up from certain domestic interests that we should retaliate on French commerce, and a bill was introduced in the House of Representatives authorizing a decided increase in the rates on leading French products, including the great staple of silk goods. This bill was referred to the Ways and Means Committee, but the leaders declined to consider it seriously. As the result of this temperate policy a breach with France was obviated, and soon after we were able to conclude the minor reciprocity treaty already referred to, under which we obtained important concessions.

W. L. C.

Pacific Coast Business Matters.

SAN FRANCISCO, CAL., June 10, 1905.—As we approach the end of the half year the outcome of the harvest does not seem quite so certain as it was a little while ago. But California has ceased to depend upon any one industry, and so long as our mines and oil wells and lumber industries are flourishing we cannot be so badly off after all.

There has been great activity in this city in realty and in building operations. Should the sales of realty keep up as they have been doing, the total of the year will exceed \$60,000,000 for this city, as that for the month of May exceeded \$5,250,000. The value of new buildings contracted for will, as shown by those for May, exceed \$20,000,000 for the year.

The exports from San Francisco to the Orient continue to be of great proportions. The Mongolia, which cleared on the 7th, had a cargo of over \$1,000,000 in value, while the Algoa, which cleared on May 31, had, including goods in transit, about as much as the other. The principal items were Texas cotton, machinery and canned meats for Japan and for the use of the Japanese army and navy. The quantity of machinery taken out

The Deutsch System of Train Lighting.

The principal claims for the Deutsch system of electric lighting for railway passenger cars are reliability of operation and low maintenance cost. In this system it has been the aim to eliminate delicate moving parts, simplify electrical connections and provide a direct connected drive, which will allow the wheels to be easily changed. As a result inspection and repairs can be made without jacking up the car, and the equipment may be maintained by a cheaper class of labor than has heretofore been found necessary. The great advantage of the axle light or unit system of electric train lighting is that each car carries its own equipment, permitting greater flexibility in the make-up of trains and requiring no auxiliary compressing or charging plants. It is the only system which can be gradually introduced on railway cars without entirely changing the existing lighting conditions.

The Deutsch system consists of a dynamo, hung from the car body; a regulator, located in any convenient place in the car; a transmission or drive, and the usual storage batteries. The disposition of the parts may be seen in Fig. 1. The storage battery supplies current for

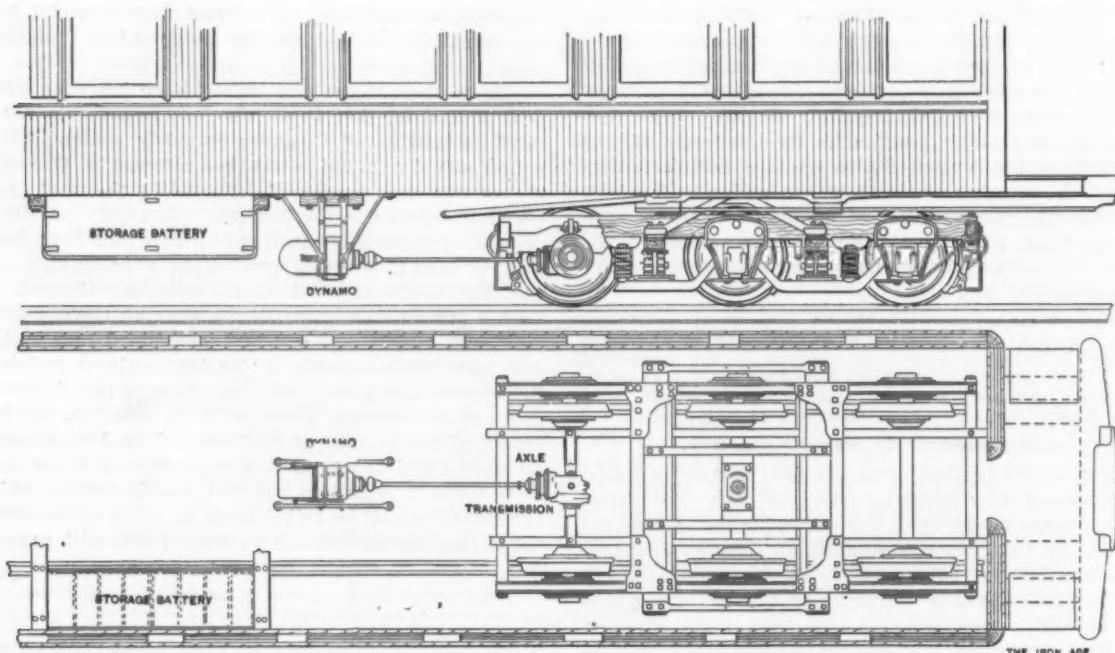


Fig. 1.—Side Elevation and Underneath View of a Car, Showing the Parts of the Deutsch Train Lighting System.

on these two vessels exceeded all precedents. The Algoa alone had over \$300,000 worth of machinery, including \$247,622 in transit.

This is the off season in business matters generally, but the hardware and iron and steel houses as a rule report business good for this time of the year and look hopefully forward to the fall. Not alone is the great amount of building in the State in their favor, but activity at the mills in the redwood and sugar and white pine sections, the extension of the oil industry, the improvement in the mineral sections generally and the building of the new railroads—the Western Pacific and its branches—all combine to make the outlook very good. The building of the new road will call for the building of new towns and branches along the route of the new road. Then there are other roads and branches, either in process of building or projected, and the outlook for business in connection with them has not been as bright in the last score of years as it is to-day.

As might be expected, the import trade has been active in order to supply the demand arising from these various sources. It has come principally from the East by rail, so that track cannot be very well kept of it, but it is known to be very large.

J. O. L.

the lights when the train is standing or running at less than a certain speed, and is charged when the train is running beyond that speed. To derive the greatest value from the storage battery, which is the most expensive part of an axle lighting equipment, and to maintain the best efficiency of that part, a reliable and uniform drive must be used. In a number of cases where two sets of batteries are necessary with a belted equipment, one set will answer the purpose if used with a properly designed gear drive.

The drive in the Deutsch system is from a steel bevel gear attached to the axle and rotating with it. This gear has a hub extension, forming a bearing immediately adjacent to the tooth face, which is encircled by a steel strap. A stud, electrically welded to this strap, carries a raw hide pinion which meshes with the steel gear and is fastened to the shaft for driving the dynamo. The shaft is telescopic, and has universal joints to allow for axle play and side motion of the truck on curves. The strap is prevented from revolving with the gear around the car axle by a rod or arm projecting upward from the strap and flexibly retained by the truck frame. A steel gear casing is cast integral with the strap, thus making the gear casing, strap and pinion bearing in two pieces, which

are bolted together and carried by the hub bearing of the axle gear. Both the gear and pinion are supported from the axle, which insures perfect engagement of the teeth under all possible conditions. This drive is not effected by snow, ice, sand, escaping steam or tipping of the truck. Its parts are simple, durable and easily accessible. There is no necessity for any work to be done under the truck in changing wheels since the whole transmission is supported by the car axle and drops out with it.

The dynamo, Fig. 2, is rigidly suspended under the car body, no springs being required. The bearings are self-aligning and ring oiled. The wear on the bearings is insignificant, since there are no strains due to belt pull and the flexible nature of the shaft connection prevents any shock from being transmitted to the dynamo. The armature can be removed, a new one substituted and everything put in proper shape for immediate service in 15 minutes. Both bearings are the same size, and all screws holding removable parts are standard and of the same size. The casting can be removed, completely exposing the machine for inspection, in one minute by simply slackening two wing nuts, and the armature or bushing can be removed without disturbing an electrical connection.

The essential parts of the regulator are an automatic switch, a controlling solenoid, an air valve, a cylinder,

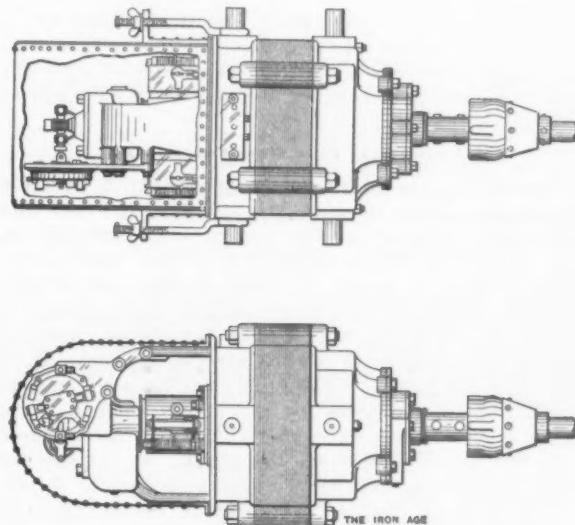


Fig. 2.—Detail of the Dynamo.

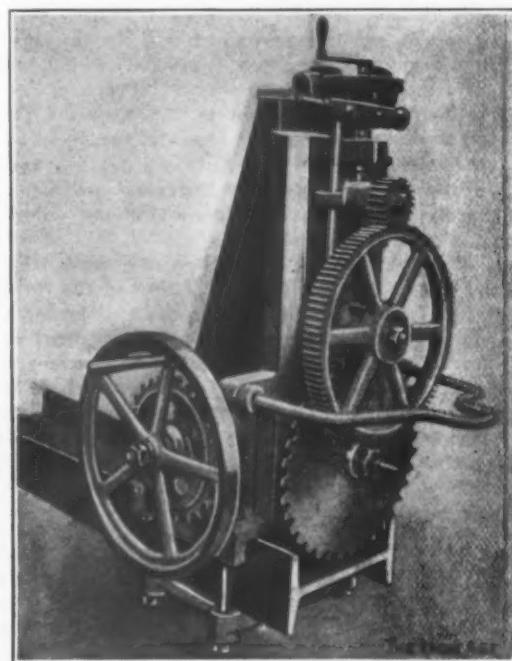
a piston working in the cylinder and carrying electrical contacts on the rod thereof, and a resistance located in the shunt field circuit of the dynamo. The automatic switch cuts the dynamo in and out of the lamp circuit above and below a certain train speed. When the train runs below this speed the lights are on the storage battery and above it they are on the dynamo. As the train speed increases and the dynamo turns faster than the speed required for maximum output, the controlling solenoid opens the air valve and admits air to the back of the piston which raises and carries with it the electrical contacts attached to its rod and cuts resistance in the shunt field circuit of the dynamo, thus reducing its output. When the train speed decreases the air valve is closed by the controlling solenoid and the piston drops by gravity, thus cutting resistance out of the field circuit until the dynamo output is again at its normal maximum. This regulator does not depend upon electrical means for its operation, but is driven by compressed air from the brake mechanism. A very small volume of air is required at about 15 pounds pressure. Its working is noiseless and there is no motion except when the train speed materially changes. There are no rotating parts to cause trouble and all electrical connections are simply and conveniently arranged.

These machines are furnished with all parts made to gauge and all corresponding parts interchangeable. The Electric Controller & Supply Company, Cleveland, Ohio, is licensee of the Deutsch patents for the United States, Canada and Mexico.

An English Portable Cold Saw.

A new portable cold sawing machine has been brought out by Carter & Wright, Halifax, England. According to the *Engineer* (London), the machine is especially designed for cutting different sections of steel used in structural work. The way in which the machine is applied can be seen in the accompanying illustration. It is capable of cutting 16 x 18 inch girders or a solid beam 6 x 16-inches. The saw is powerfully geared and can be driven either by hand or motor. The power is applied directly to the periphery of the saw, by a hardened steel driving pinion engaging the notches between the teeth of the saw. The pinion is made wide enough to allow the saw to be adjusted laterally as much as $\frac{1}{2}$ inch, to give some leeway in clamping the machine to the work.

The method of gearing is claimed to give rigidity and insure accurate cutting. It is also claimed that less power is absorbed than would be required by the use of more gearing and that vibration is at the same time greatly reduced. The machine is provided with an automatic variable feed having four changes and a stop motion. A few of the advantages advanced for the ma-



A New Portable Cold Saw, Made by Carter & Wright, Halifax, England.

chine are low cost, more durable and cheaper saws, a smaller diameter saw required to cut a given area, less space required for the machine and greater output of work obtained. Above all else the machine is a convenient one to use, as it may often be easier to take the machine to the work than work to the machine.

New Publication.

Annual Statistical Report for 1904. By James M. Swank, general manager of the American Iron and Steel Association, 261 South Fourth street, Philadelphia. Pages, 136. Price, \$5.00, or 21 shillings, per copy.

The Annual Statistical Report of the American Iron and Steel Association has won for itself a very high place in the technical literature of the world. It gives the statistics of production of iron and steel in the United States as obtained by the association directly from the producers. The accuracy of the statistics is unquestioned, and they are accepted as official by statisticians throughout the world. The report just issued not only gives the statistics of production for 1904, in continuance of the plan of the report for previous years, but also gives a statistical abstract of an additional line of such information as is in constant demand relating to every branch of the iron trade, and going as far back in each instance as such statistics are available.

In the Harrisburg and Lebanon Districts.

(*Special Correspondence.*)

HARRISBURG, PA., June 20.—Some noteworthy work is now passing through the bridge and construction department of the Pennsylvania Steel Company, at Steelton, for the new Blackwell's Island Bridge at New York. The equipment required in the work of erection is of the largest capacity ever provided in the history of the company's operations, the travelers being called on to support 120-ton loads. Owing to the necessity of carrying on the work of erection without any obstruction of river traffic, the combined weight of the steel work the travelers will support in the air at one time will be close to 500 tons. The nickel steel pins for this bridge, now being machined at the Steelton Bridge Works, are 18 inches in diameter and from 6 to 8 feet long, a 2-inch hole being bored through each. A special lathe driven by a 40 horse-power motor is provided for this work.

The Central Iron & Steel Company of this city has been making considerable shipments of plates for the Montreal Bridge, and is also furnishing material for the Blackwell's Island Bridge at New York. The basic open hearth plant of this company, which was put in operation last year, has been doing good work, the recent output being from 1950 to 2000 tons a week. Preparations are being made to take hot metal to the open hearth department from the company's Paxton furnaces, which together are producing about 300 tons a day. A number of improvements are under consideration for the Central Works, including a new trestle for the unloading of blast furnace stock.

The Eastern Pig Iron Association meeting in Harrisburg on June 14 was well attended. Most of the furnaces represented have from three to six months' business on their books, and while new business was reported to be light, it was noted that shipments from furnaces were being made with a good degree of regularity, there being only about 1 per cent. of contract metal on which delay in shipments was requested. It is expected that the fall meeting of the association will be held in the Port Henry district, New York.

Cornwall Ore Mines.

The Cornwall iron mines are now shipping an average of about 2500 tons a day and a force of 500 men is employed by the Cornwall Ore Bank Company. As has been the case for a number of years, operations are centered in Middle Hill, though preparations are being made to work the east side of the ground between worked-out Big Hill and Middle Hill, now covered by railroad tracks. The Robesonia cut, in which the Robesonia Iron Company, Limited, is working a 50-foot face of ore, is on the west side of the ore wall that separates the two hills. The ore won by the Robesonia interest is reported to be the best in the deposit, and the Cornwall Ore Bank Company, which is building a hoisting plant preparatory to working from the east side of the same ore body, is seeking to give the other consumers a better ore than they have been receiving in recent years. The installation of an ore crushing plant is contemplated and in the near future ore will be delivered to the furnaces in sizes for easy working. At present hand labor is employed to break the larger lumps in the cars on the arrival of the ore at the furnaces and before it passes to the roasters. There is also some breaking of the very large lumps with sledges at the mines. Most of the loading at the mines is by hand, but one steam shovel is now in use in Middle Hill, on the present floor of the mine, loading ore that has been loosened up by blasting.

The considerable proportion of fine ores mined at Cornwall and the lessening of the average iron content of the shipments of the past year or two have made the question of concentration and briquetting a very live one with furnaces dependent on the Cornwall deposits. Recently much of the ore shipped has run but 38 per cent. in metallic iron, so that fully 2½ tons have been required for a ton of pig iron, while the limestone runs about 40 per cent. of the ore charge, and the coke consumption is fairly staggering to a furnace superintendent previous-

ly accustomed to Lake Superior ores. It is not surprising that money is being spent on concentrating, briquetting and cintering plants, and it may be expected that important developments in these directions will come in the near future in the district tributary to the Cornwall hills. The accumulation of flue dust at all blast furnaces has made briquetting and clinkering propositions of interest to furnacemen in all parts of the country, and those in eastern Pennsylvania appear to be giving it a full share of attention.

The Pennsylvania Steel Company has acquired from Naylor & Co. of New York the right to use the Gröndal process of concentrating and briquetting iron ores. This process was described in a paper read by Prof. Henry Louis of Newcastle-on-Tyne before the Iron and Steel Institute at its May meeting, 1904, under the title "The Manufacture of Pig Iron from Briquettes at Herräng." It was first employed early in 1904 by the Herrängs Grufaktiebolag of Stockholm, whose iron mines and charcoal furnaces are located on the Baltic coast of Sweden about 60 miles north of Stockholm and some 30 miles east of the famous Dannemora mines. In brief, the operations as described by Professor Louis are as follows: "The ore is conveyed from the mines by aerial wire ropeways to the crushing works, where it is broken and crushed wet. The pulp thus produced runs to the magnetic concentrators, which take out the magnetite. The latter is conveyed to the briquetting house, where it is stamped into briquettes, which pass next through the briquetting furnace, in which they are burned and then hoisted to the top of the furnace." It is understood that a large concentrating plant which the Pennsylvania Steel Company is now completing at Lebanon will also embody interesting features of its own.

Centrifugal Flue Dust Collection.

Recent experiment in the Lebanon district with the centrifugal method of separating ore dust and coke dirt from blast furnace gas has proved quite satisfactory, and the system will be installed at several Eastern furnaces in the near future. Cleaning of stoves and of boilers is much less frequent than formerly; the efficiency of both is greatly increased. Unlike various gas washing devices, the centrifugal method gives a dry cleaning of the tunnel head gases. While this cleaning is not such as would prepare the gases for use in gas engines, it removes a very large part of the solid matter carried over with the gas and prevents the glazing of the checker work that in time calls for the overhauling of the stoves.

The Lebanon County Light, Heat & Power Company is the name of a new corporation identified with the Pennsylvania Steel Company, which has recently run a pipe line from the Semet-Solvay coke ovens adjoining the North Lebanon furnaces to the nut and bolt works of the American Iron & Steel Mfg. Company, 2 miles distant. The expectation is that nearly 3,000,000 cubic feet a day of gas from the by-product ovens will be delivered to the last named company for its puddling and heating furnaces. Heretofore this gas has been taken off through bleeders and burned in various parts of the coke oven yards, but without performing any useful service. Pressure blowers driven by a 50 horse-power motor will be employed to send the gas through 10-inch pipes to the nut and bolt works. It is expected that gas will be furnished under this arrangement by July 1. The Semet-Solvay plant at the North Lebanon furnaces is now producing about 750 tons of coke a day, nearly all of it used in the company's blast furnaces. There are 90 ovens grouped in three batteries, and for some time fully 110 ovens have been "pushed" every 24 hours, the plant showing an efficiency of about 125 per cent. of that rated.

Changes in By-Product Coke Ovens.

Important work has been under way for some time at the by-product coke oven plant of the Lackawanna Iron & Steel Company at Lebanon. There are 232 Otto-Hoffman ovens, arranged in four batteries. For the past three years the plant has been idle, owing to some difficulties growing out of charging the ovens at the side. Formerly the coal was rammed and charged as a cake. There were drawbacks in this practice in view of the use of coals of differing volatile content. In the recent recon-

struction of these ovens four charging holes have been provided in the top of each oven and hereafter the coal will be charged from the top by larries. A crusher is being installed by the Jeffrey Mfg. Company of Columbus, Ohio. It will have a capacity of 100 tons per hour and will be driven by a 125 horse-power Harrisburg engine. Instead of one unloading track three will be provided, and there will be three hoppers, so that any desired mixture of coal can be made. A new conveyor is being put in under the three hoppers to deliver the coal to the crusher, from which it will be carried by a belt conveyor up an incline to the 3800-ton bin originally constructed. From this large bin the coal drops upon a conveyor and is carried to a bin of 150 tons capacity, from which the larries are filled. There will also be provided two horizontal conveyors, one on each side of the 3800-ton bin, which will deliver coal to the cross conveyor leading to the smaller bin. There are four larries, one for each of the batteries of ovens, and they are driven by electric motors over a standard gauge track above the ovens. The new equipment provided will make possible the mixing of coals of low and high volatile content so as to secure the desired structure in the coke. It is expected that when the changes are completed, which will be within six weeks or two months, a product of 1000 tons of coke a day will be possible. A production of upward of 2,000,000 cubic feet of gas per day will be reached under full operation, and it is the plan to pipe this gas to the Wehrum ore roasting plant of 14 kilns, located near by. Another change in the coke oven plant is the removal of the electric motors heretofore used for driving the exhausters in the ammonia house. Instead three 75 horse-power engines have been installed, built by the New York Safety Steam Engine Company. Another change in the ammonia house is the substitution of cast iron pipe for wrought pipe.

The College Graduate in Industry.

Alex. E. Outerbridge, Jr., of William Sellers & Co., Incorporated, Philadelphia, recently delivered his thirteenth annual address before the Wharton School of Finance and Commerce of the University of Pennsylvania. Speaking on "The Attitude of College Men Toward Business Activities," he said in part:

"What are the opportunities in industrial affairs? What is the opportunity for college men in the commercial branches of industry? Are there any new limitations placed on individual initiative? Can a young man or group of young men look for success from diligent, intelligent, persevering, honest effort to build up a new manufacturing or trading house in any staple line of goods, or must they accept secondary salaried positions in great organizations? Must the young man who desires to build up a business confine himself to launching some specialty, novelty or monopoly? Here are a number of important questions concerning the opportunities now offered in industry.

"In answer to the first, I believe there never was a time when conditions were so favorable and opportunities so great as they are to-day for college men of the proper stamp to secure *entrée* to large industrial enterprises. The graduates in technology, who have come like an invading army into the workshops in recent years, have, through their superior education in fundamental principles and through their willingness to begin at the bottom of the ladder, swept away most of the prejudice against college men which formerly existed in the minds of employers. But there has not been a like concerted advance of college graduates equipped by training to grasp commercial problems. Such problems are just as important to the successful conduct of any large industry as are the technical details of manufacturing. The commercial end of the industry is becoming more and more separated from the technical branches and calls for a broader knowledge of commercial law and principles than it did in former years. There is a new and strong demand thus created for men of genius and training to manage the distinctly financial and commercial departments of industrial enterprises. One of the largest manufacturing estab-

lishments in the world has sent a bright young man from its Philadelphia office to a leading university to prepare himself by a college education for the financial end of the business. This was not an act of philanthropy, but an investment on the part of the concern. It is likely to prove another wedge which will open up a new departure in the education of enterprising young men now employed in industrial works.

"In answer to the question as to the limitations placed on individual initiative, I think it must be admitted that it is more difficult to-day to make a successful start in business than formerly, but new opportunities are constantly presenting themselves with new methods of work. These new opportunities more than counterbalance the handicaps of the present system after the start is made.

"In answer to the third question, my belief is that while the college graduate must expect to occupy at first a very minor position in great organizations, he can acquire the knowledge and experience necessary to rise to a leading post of responsibility, and he will find that these great organizations afford the best means of gaining such experience. Furthermore, they present opportunities without number for rapid advancement and to a greater extent than was formerly the case. It is a source of constant remark by visitors from the old world that the leading men in almost all the great industries of America are surprisingly youthful.

"The last query refers to the 'way to start.' Some young college men enter industrial establishments with the idea that their education is finished. A graduate of one of the leading technical schools some time ago obtained employment in our works. A month or two after his entrance he brought to me a paper, which I had prepared for the foundry work of the day, and said: 'This must be a mistake; it is an evident absurdity, for the thing proposed to be done is an impossibility; we were taught that this cannot be done; it is opposed to all the principles of metallurgy. One of my classmates had a graduating thesis on this very subject last year.' I said very quietly: 'My dear boy, I do not question your word, but we have been doing this same operation on a large scale every day for ten years and will no doubt continue to do so irrespective of what you were taught or even of the graduating thesis. This is a process which was devised in these works and it has proved eminently successful. But I am not surprised that you did not know of it, for it has never been published and is carefully guarded as a trade secret.'

"The advantage that the college graduate has over others not so fortunate is that in addition to what has been taught him before entering upon his life work he has learned how to acquire information when needed, and that is a great gain, indeed. On one occasion I asked the views of a famous lawyer on a subject with which I supposed he was perfectly familiar. He surprised me by saying: 'I know no more about it than you do. The difference between us is I know how to obtain the knowledge and you don't.' The college teaches method; it broadens and polishes a man and in this way fits him to take a commanding position among men in after life, but it does not teach him the practical side of affairs, for that can only be gained by hard work and diligence in labor. Given these two qualities, I am firmly convinced that the college graduate who enters into industrial activities in a humble capacity, with the determination to succeed, will soon outstrip his less thoroughly equipped mates and in a few years will pass those who have entered the race in advance of him."

The attractiveness of industrial life was never so strong as at present. The handling of masses of men and machinery in industrial works may be compared to the maneuvering of an army, and the successful captain of industry brings into play forces that tend to build up, not to destroy, material wealth, while he contributes his quota to the advancement of civilization. A great merchant or manufacturer is a power in the community in which he lives second to none; his position in the social scale is in this country at least on a par with the statesman, the professional man and the man of letters; he is even selected, by reason of his wide experience and broad views,

to represent his country in foreign courts, and with few exceptions he has done credit to the nation. Heretofore the successful manufacturer or merchant has been, in the majority of instances, a self made man, as was natural in a new country, but a new class has arisen, with new opportunities, which were not possessed by the older generation, and with new obligations corresponding to those wider opportunities.

"The old idea that a college training unfit a man for industrial pursuits is no longer tenable, and I feel confident that as the years go on a larger and larger proportion of college graduates will be found in the ranks and occupying commanding positions in all industrial pursuits."

The American Society for Testing Materials.

The eighth annual meeting of the American Society for Testing Materials will be held at Atlantic City, N. J., June 29-July 1, with headquarters at the Hotel Chalfonte. Preceding the sessions for the reading of papers a business meeting will be held on Thursday, June 29, at 3 p.m., at which the annual report of the Executive Committee will be presented. An amendment to the by-laws will be submitted, providing that membership in the International Society for Testing Materials be left hereafter to the option of individual members of the American Society. Heretofore \$1.50 of the \$5 annual dues of each member has been sent to the International Association for Testing Materials. In view of the fact that since the last international congress in 1901 the American Society has remitted nearly \$2000 to the International Society, for which the American members have received practically no return, the congresses of the International Society having been postponed from year to year, the change above referred to is now recommended.

In addition to the election of officers several reports will be presented to the business meeting of June 29, including those of the following committees: Committee K, on Standard Methods of Testing, by Gaetano Lanza, chairman; Committee O, on Uniform Speed in Commercial Testing, by Paul Kreuzpointner, chairman; Committee P, on Fire Proofing Materials, by Ira H. Woolson, chairman; Committee Q, on Standard Specifications for the Grading of Structural Timber, by Herman von Schrenck, chairman.

On Thursday evening the society will hold a joint meeting with the Society for the Promotion of Engineering Education. The annual address will be given by President Chas. B. Dudley; subject, "The Testing Engineer." Other papers of the evening are the following: "A Course of Laboratory Instruction in Testing Materials," by W. K. Hatt; "A Course in Properties of Materials," by G. L. Christensen, and "Plan and Scope of the Proposed Investigation of Structural Materials under the Auspices of the United States Geological Survey," by J. A. Holmes and Richard L. Humphrey.

On Friday morning, June 30, at 10 o'clock, separate sessions will be held by the section on cement and the section on preservative coatings. At the latter meeting two reports will be presented, that of Committee E, on Preservative Coatings for Iron and Steel, S. S. Voorhees, chairman, and that of Committee N, on Standard Tests for Lubricants, by W. M. Davis, chairman. A topical discussion on "Standard Specifications for Preservative Coatings for Steel" will be introduced by C. B. Dudley, Robert Job, A. H. Sabin, Maximilian Toch and Cyril de Wyrall. A topical discussion on "What is the Best Method for Painting Steel Cars?" will be introduced by F. P. Cheesman, G. W. Thompson and S. M. Evans. The papers of the session are on "Protection of Iron and Steel Structures by Means of Paper and Paint," by Louis H. Barker, and "Proper Methods in Conducting Painting Tests," by G. W. Thompson.

The fourth session, which will begin at 3 p.m. on Friday, will be devoted to iron and steel. The program follows: Report of Committee A, on Standard Specifications for Iron and Steel, by W. R. Webster, chairman. This report will embody the proposed revised Standard Specifications on (1) Structural Steel for Bridges, (2)

Steel Rails, (3) Steel Castings, (4) Steel Axles, (5) Steel Forgings. "Some Causes of Failure of Rails in Service," by Robert Job. Report of Committee M, on Standard Specifications for Staybolts, by H. V. Wille, chairman. "Influence of Methods of Piling Staybolt Iron on Vibratory Tests," by H. V. Wille. A preliminary report on Tests of Nickel Steel and Carbon Steel under Combined Stresses, by E. L. Hancock.

The evening of Friday will be left open and arrangements will probably be made for an informal smoker.

The session of Saturday morning, July 1, beginning at 10 o'clock, will take up cast iron, and the following reports and papers will be presented: Report of Committee B, on Standard Specifications for Cast Iron and Finished Castings, by Walter Wood, chairman. This report will embody the proposed Standard Specifications for (1) Car Wheels and (2) Gray Iron Castings. "A Comparison of Standard Methods of Testing Cast Iron," by Richard Moldenke. "Hard Cast Iron: the Theory of One of Its Causes," by Henry Souther. "Thermite Process in American Practice," by E. Stuetz.

The last session, on Saturday afternoon at 3 o'clock, will be devoted to miscellaneous subjects. The report of Committee G, on the Magnetic Testing of Iron and Steel will be made by J. Walter Esterline, chairman; the report of Committee H, on Standard Tests of Road Materials, by L. W. Page, chairman, and the report of Committee R, on Boilers, by E. D. Meier, chairman. Papers are scheduled as follows: "A Large Hydraulic Testing Machine for Uniform Loads," by Robert A. Cummings; "Specifications for Cotton Tapes for Electrical Purposes," by R. D. DeWolf; "Rail Sections as Engineering Structures," by P. H. Dudley.

Sunday, June 18, was the fiftieth anniversary of the passing of the first steamer through the Sault Ste. Marie Canal from the lower lakes to Lake Superior. The *Marine Review* says that the steamer Illinois was locked up on that day, and immediately thereafter the side wheel steamer Baltimore was locked down. The largest cargo of iron ore carried through the canal in its first year was 337 tons, taken to Lake Erie port in 1856 by the schooner Queen City. The iron was shipped by the Jackson Iron Company of Marquette. Four days were required for loading the vessel, the crew wheeling barrows up the gangplank leading from the dock. To get the iron out of the vessel it was necessary to build staging in the hull about half way up. The iron was shoveled to the staging, then to the deck, and finally from the deck to the dock. Four days were required for unloading.

The use of steel in passenger car construction is an innovation of the last two years, but quite a number of such cars are now in service. Among the first steel cars put in use were those built for the Interborough-Rapid Transit Subway in New York. A number of cars of a similar type were built for the Long Island Railroad. The American Car & Foundry Company has also built steel passenger cars for the Baker Street & Waterloo Underground Railway in London. This is one of the largest tube railways in London, and steel cars were employed, as in the New York Subway, as a safeguard against accidents by fire or collision. The cars were built at the Berwick Works of the American Car & Foundry Company and shipped "knocked down" to Manchester, England. The builder bought ground in Trafford Park, near Manchester, and put up temporary shops for erecting the cars for delivery to the railway.

Members of the Canadian Manufacturers' Association have been notified recently through their organization that the Dominion Government is practically certain to appoint a tariff commission at the present session of Parliament to enter upon a general revision of the tariff. Special meetings of the various sections of the association will be called to discuss the matter, and Canadian manufacturers are being urged to prepare data relating to their various branches of industry.

A Remarkable Compound Engine Test.

What is thought to have proved to be the most economical steam engine ever built was recently tested in Belfast, Ireland. The accompanying report of the test was taken from the *Engineer* (London) of June 2, 1905. From the table it will be seen that the lowest steam consumption per horse-power per hour was 8.585 pounds, obtained in the fourth run, although nearly as good results were obtained in two other tests, and all were excellent. The engine was one built by Cole, Marchent & Morley, Bradford, England, rated at 500 horse-power at 100 revolu-

Corliss valves has ever been operated satisfactorily at anything like 700 degrees F. superheat.

The test was conducted with extreme care and may be taken as of unquestionable accuracy. The steam consumed was measured by weighing the discharge from the condenser by the two-tank method, one being weighed while the other was filling. As all parts were steam tight it was unnecessary to allow for leakages at valve spindle or piston rod glands. The cylinders were, respectively, 21 and 36 inches in diameter by 36 inches stroke, the ratio between the high and low being 1 to 2.984. By virtue of the valve gear the makers claim that the engine can be

Report of the Test.

Particulars of Observations.	I.	II.	III.	IV.	V.	VI.
Number of trial	1.842	1.854	1.961	0.5277	1.408	0.90
Duration of trial, hours	14.68	14.5	14.4	14.4	14.4	14.4
Atmospheric pressure by aneroid barometer, lb. per sq. in.						
Steam.						
Weight entering high-pressure cylinder per hour, lb.	4370	4272	3088	1272	2863	2240
Condensed steam drained from reheater per hour, lb.	0	0	0	0	0	0
Pressure by gauge on boiler side of engine stop valve, lb. per sq. in.	117.5	117.5	117.5	114.5	117	114.5
Temperature of steam boiler side of engine stop valve, deg. Fah.	743	738	740	726	751	732
Superheat of steam boiler side of engine stop valve, deg. Fah.	395	390	401	378	403	394
Temperature of steam entering high-pressure cylinder, deg. Fah.	601	590	569	550	580	558
Superheat of steam entering high-pressure cylinder, deg. Fah.	253	242	221	202	232	210
Drainage from pipe between cylinders per hour, lb.	0	0	0	0	0	0
Exhaust Steam.						
Temperature at exit from engine, deg. Fah.	120	117	104	110	97.5	93
Temperature of water leaving hot-well, deg. Fah.	102	101	79	70	71	64
Vacuum gauge, in. of mercury	26.4	26.4	27.0	26.5	27.4	27.4
Powers.						
Mean effective pressure in high-pressure cylinder from mean diagram, lb. per sq. in.	41.4	41.25	33.6	13.63	31.4	24.25
Corresponding indicated horse-power developed in high-pressure cylinder, I.H.P.	256.2	255.6	201.8	84.5	194.6	150.2
Mean effective pressure in high-pressure cylinder by planimeter from actual diagrams, lb. per sq. in.	41.5	41.6	32.6	13.85	31.4	24.1
Corresponding indicated horse-power developed in high-pressure cylinder, I.H.P.	256.0	257.7	201.8	85.8	194.6	149.3
Mean effective pressure in low-pressure cylinder from mean diagram, lb. per sq. in.	12.18	11.12	7.80	3.33	7.51	5.83
Corresponding indicated horse-power developed in low-pressure cylinder, I.H.P.	225.1	205.5	145.7	61.6	138.9	107.8
Mean effective pressure in low-pressure cylinder by planimeter from actual diagrams, lb. per sq. in.	12.14	11.08	7.91	3.30	7.5	5.83
Corresponding indicated horse-power developed in low-pressure cylinder, I.H.P.	224.3	204.8	146.0	61.0	138.7	107.8
Mean pressures referred to low-pressure cylinder from mean diagrams, lb. per sq. in.	26.00	24.94	18.81	7.87	18.04	14.38
Mean area of low-pressure cylinder, sq. in.	1010	1010	1010	1010	1010	1010
Revolutions (by counter).	100.6	100.7	100.6	100.7	100.7	100.7
Piston speed in low-pressure cylinder per minute, ft. per min.	603.6	604.2	603.6	604.2	604.2	604.2
Indicated horse-power	481.3	451.1	347.5	145.5	333.5	258.0

Heat Account (from 32 deg. Fah.) in B.T.U.

	B.T.U.	Per cent.	B.T.U.	Per cent.	B.T.U.	Per cent.	B.T.U.	Per cent.	B.T.U.	Per cent.	B.T.U.	Per cent.
Gross heat supply entering engine per minute	100,540	100.0	97,890	100.0	71,060	100.0	66,700	100.0	51,230	100.0	29,040	100.0
Heat equivalent of indicated horse-power per minute	20,410	20.3	19,550	19.98	14,734	20.7	14,140	21.5	10,940	21.4	6,170	21.2
Heat leaving engine in exhaust steam per minute, and												
Balance of heat account, errors of observation, losses by radiation, &c., per minute	80,130	79.7	78,340	80.02	56,330	79.8	51,050	78.5	40,290	78.6	22,870	78.8

Deductions (Reckoned from Hot-well Temperature).

Heat supplied per minute per indicated horse-power, B.T.U.	198.25	201.7	197.6	192.1	194.0	194.0
Work actually obtained for 1 lb. of steam, ft.-lb.	217,700	218,700	222,800	230,600	228,000	226,500
Thermal efficiency, per cent.	21.39	21.02	21.46	22.07	21.86	21.86
Heat theoretically required per minute by the institution of Civil Engineers' standard of comparison per indicated horse-power (Rankine's cycle), B.T.U.	142.4	142.5	130.2	128.0	120.0	128.5
Maximum work theoretically obtained from 1 lb. of steam working in a Rankine ideal engine between the limits of temperature given in lines 11a and 106, ft.-lb.	303,400	301,800	337,600	344,600	349,800	340,700
Efficiency ratio	0.72	0.71	0.66	0.67	0.65	0.66
Thermodynamic efficiency of engine	0.72	0.71	0.66	0.67	0.65	0.66
Pounds of steam used per indicated horse-power per hour, lb.	9,098	9,207	8,886	8,585	8,682	8,742
Equivalent consumption of saturated steam reckoned from temperature of hot-well, lb.	10.68	10.41	10.33	10.03	10.07	10.12

lutions per minute, with a steam pressure of 120 pounds. The engine was installed for the Durham Street Weaving Company, Limited, Belfast. The report of the test was made by Michael Longridge of the British Engine, Boiler & Electrical Insurance Company.

The engine is an inverted vertical cross compound marine type and has a reheating receiver between the cylinders. The latter are unjacketed. The valves are of a drop piston pattern, which seems to possess the advantages of the drop valve and Corliss valve without their disadvantages, and may be satisfactorily lubricated. In constructing the engine it was the aim to take advantage of a superheat of 700 degrees F. The makers claim that from their experience it has been found that the Corliss valve is unsuitable for temperatures above 500 degree F., and so far as is known no engine with true

run faster than would be safe with either the drop valve or the Corliss valve, the limit in most cases being decided by the piston speed rather than the valve gear.

Each cylinder has four piston valves, one at each end, to admit steam and one at each end for exhaust. The steam valves are opened by eccentrics and closed by springs through a trip gear. The cut off on the high-pressure cylinder is controlled by the governor and on the low pressure by hand. The exhaust valves are opened and closed by eccentrics. The steam is supplied by a Lancashire boiler and superheated in an independently fired Schmidt superheater containing 1033 square feet of heating surface and 11½ square feet of grate surface.

The engine was said to have been in operation over a year and ran very satisfactorily during the trials without a leak anywhere and with every bearing cold. After

stopping, one of the high pressure steam valves was taken out and found to be in perfect condition throughout. The conclusion is that no trouble need be anticipated from the effects of high superheat upon the valves; nor is there any probability of trouble when the steam is once within the cylinder, as there it will not be much hotter than high pressure saturated steam. If any trouble is to be expected it may be looked for in an effect of the high temperature upon the tubes of the superheater, although as yet no such trouble has been experienced.

Lake Iron Ore Matters.

DULUTH, MINN., June 17, 1905.—There is no sign of trouble anywhere along the horizon of the iron ore mining and shipping trade. Storms may arise of course during the summer, but they have not yet gathered. If at times during the past few weeks there have been faint premonitions of disturbance on one range or another they have been quieted with ease, and the flood of business has been maintained at full tide. The little labor difficulty at Hibbing, on the Mesaba range, at the beginning of the shipping season in April, did not last long. Mine managers always expect some little labor unrest when the harvest fields begin to call for men, but up to this time they have no reason to anticipate anything objectionable. The increase in proportion of output this year from open pit mines is a factor in the situation that must have its effect and which cannot be other than important. It is quite likely that June shipments will come close to 5,000,000 gross tons.

The successful bidders for the construction of the new Mesaba road for the Duluth, Missabe & Northern are now building camps, distributing supplies and getting ready. Contracts have been given to agents for the labor supply and the work of grading will be under way soon. It is not probable that this work will call for a very large force of men until late in the year. Much of the line is through swamps and will not require the labor that a more rough country would demand.

Gogebic Range Activity.

The Gogebic range is falling into line with others in the exploration of new properties and the reopening and development of old ones. Reference has been made to the work in the near vicinity of Ironwood, in the Schlesinger betterments at Newport and others. The Jones & Laughlin Steel Company is at work at old Hennepin and Pence, as has been stated, and it will be but a short time before ore is coming out of the two shafts now on the former. Diamond drills are working there, and an attempt is under way to explore the mine to greater depths than have ever been reached. There is great hope that deposits of ore at greater depth may give to these old and long idle mines a permanence that has been gained for other Gogebic properties in the same way. East from Bessemer much new work has begun, and some of the old workings that are revived are looking very well. The Colby has been growing into prominence as the result of new finds, is now employing a large force and is taking out considerable ore. It is looking better underground than in years. Ironton and old Jackpot, which was abandoned by Jones & Laughlin a few years ago, are both looking well. At Eureka, two miles east of Bessemer, drilling seems to have disclosed ore, and pumps are going in to unwater the old openings and prepare for active mining. At Wakefield old Comet and Joliet are both to be overhauled and revived and both may send out some ore shortly. That explorations were to start on the western end of the range, over in Wisconsin near Mellen, has been stated in this correspondence. Some of this work is now in progress. On the active portion of the Gogebic mining operations are more rapid than before and the tonnage of this year is sure to be very large.

In the Less Prominent Districts.

It is stated by those who claim to know that interests connected with the Northern Pacific road have taken over some of the Adams lands in the Deerwood region and will explore them for iron ore. If this is true ex-

tensive exploration will begin on these lands soon. A shaft will be sunk on Section 8, T. 45-29, by Pickands, Mather & Co., the work to begin at once. This will test the formation better than any number of holes and will cost little more than drilling. Whatever may be said by enthusiasts, it is not probable that ore has yet been found in this district in sufficient quantity and of good enough quality to assure any one that the region is safe as a mining proposition, though as to the pretense of iron ore there does not now seem to be any doubt.

In the Baraboo district, central Wisconsin, the work under way now is about as follows: The Illinois mine is making a daily shipment of 350 to 375 tons to the International Harvester Company, Chicago. This is an ore running better than 55 per cent. The Pittsburgh Steel Company is drilling with a considerable force. W. H. Donner and associates of Pittsburgh are drilling with two machines under the superintendence of Oscar Rohn. Dickie Bros. are drilling with one machine. The Iroquois Company is still idle, after paying advanced royalties. The district is not as active as had been hoped by many of those interested and does not seem to progress very rapidly toward a place of importance in the Lake Superior list. It will do far less this year than the Michipicoten, in spite of the strength of those interested there, its proximity to Chicago furnaces and the low royalties asked. Late advices from Michipicoten are to the effect that the Helen mine will produce about 250,000 tons this year, well up to its high water mark; that a new level is being opened, about 240 feet below the bottom of old Lake Boyer, and that the ore seems to be dipping to the east under the great siderite bluffs.

Fast Iron Ore Loading.

As an example of how fast iron ore may be handled by steam shovel from stock pile to cars the record of the Hull mine, made a few days ago, will be instructive: A 95-ton Bucyrus shovel is employed in the work, and in 5 hours and 36 minutes the record was 138 carloads, or 4140 gross tons. It is not easier to load from a stock pile than from an open pit mine direct. One shovel has loaded at the Stevenson mine more than 7000 tons in ten hours direct from the mine, and three loaded in one day last summer at the Burt more than 18,000 tons. A few days ago a stripping record of 700 dump carloads of earth and boulders was made at the Adams work in one ten-hour shift. This time included a loss of about 100 minutes, part by backing the shovel out of the way of a big boulder which had to be blasted out, and part by the breaking of a small casting on the machine. Ideal stripping conditions require the bank to be about uniform and some 23 to 25 feet high; in this case part of the day's work was in a very hard bank and part in one that was so low as to require frequent moves of the machine.

Electric Power for Railroads Probable.

General Manager W. A. McGonagle of the Duluth, Missabe & Northern has recently been at Pittsburgh, where he was an interested spectator at tests of the Westinghouse-Baldwin single phase electric freight locomotive. It is possible that with certain modifications and adaptations the electric freight locomotive can be safely adopted for iron ore traffic on the northern Minnesota lines, and it seems very likely that in a short time tests will be made with that in view. Construction on the water power development of the Great Northern Power Company at Duluth, which would be the source of power, is progressing with remarkable speed and is now far ahead of what was expected when the project was financed last winter. It is probable that in little over a year the works will be ready and power will be generated in this city on a very large scale. D. E. W.

Pronounced activity prevails in all building lines in Milwaukee. During the month of May 496 building permits were issued, representing an aggregate of \$949,168, as against 454 permits and \$726,007 for May, 1904. It is expected that construction work in the city during the month of June will exceed that of the same period last year by \$300,000.

Foundry Cost Systems.*

BY ELLSWORTH M. TAYLOR.

The properly regulated, modern cost system is the relentless eye constantly examining and scrutinizing every nook and corner of your business, calling your attention automatically to leakages and excessive expenditures, substantiating or disproving whatever information may have come to you verbally or by observation, enabling you immediately to use all your energy and brains to cure the sore.

"Why is it," asks the manufacturer, "that we only show a profit this year of 12 per cent, as against 20 per cent. one year ago? We have been operating under practically the same conditions and have figured our selling prices in the same way."

There is evidently a serious error in your costs. Your direct labor on certain jobs has greatly exceeded your estimate. The amount of your burden or unseen dollars has exceeded your expectations. Your orders have actually happened to run to that class of goods which you are regularly selling at a loss because you have no accurate method showing what your actual burden or unseen dollars amount to, and your method of applying an inaccurate burden to your first cost to establish your selling price is radically wrong. Your crude method of using your pay roll and material expenditures gives you no proper line on your leakages, which you should measure in dollars and cents at least once a month, instead of allowing it to go undiscovered until the end of a fiscal year, when it is too late.

To illustrate how easy it is for the foundryman to deceive himself in regard to his costs one example will suffice:

An Example of Inaccurate Costs.

Some capitalists were considering the advisability of investing \$150,000 in cash in an established business, including a foundry and machine shop. The statement had been made that the iron castings were costing at an average not more than \$1.67 per 100 pounds. I was delegated to visit the plant and conduct a general investigation. In order to test the accuracy of the foundry costs I selected a month in which it was claimed the cost was \$1.77 per 100 pounds. On examining the cost method I found that several important points had not been taken into consideration. I drew up the data in the proper manner, supplied the missing links, and the actual cost of the castings was found to be \$2.13 per 100 pounds, and not \$1.77.

Part of the product of this foundry was sold to the machine shop and figured in the machine shop costs at \$2 per 100 pounds, and the balance was sold to the trade at an average of about the same amount. Thus this foundry was actually losing money at the rate of 13 cents per 100 pounds, instead of gaining 23 cents, as shown by their cost report. The existence of this leakage was a great surprise to the officers of the company and they immediately acknowledged the inaccuracy and weakness of their cost method.

Of how much value is this kind of information to the foundryman? It may mean the very life of his business. Accurate cost methods are of equal value to the small and large foundry, and the general scheme of foundry costs is the same whether you are operating a jobbing foundry or a foundry in connection with a machine shop. As a matter of fact, the machine shop foundry must be considered in the light of a jobbing foundry—that is, the treasurer of the company agrees to buy the entire output of the foundry for a certain period at certain fixed prices, and the foundry must produce good castings at a cost sufficiently less than the market offers to warrant the treasurer in setting the foundry up in business.

If the foundry cannot do this it would be to the advantage of the business to close the foundry and buy the castings outside. And the treasurer cannot afford to deceive himself as to the actual conditions. He will

have installed a monthly cost report, divided into three general sections: Metals melted, producing labor, expense. The monthly postings to these sections will be made up as follows:

Materials Account.

In every foundry there are certain materials which are purchased from hand to mouth—that is, in quantities which are practically used up from month to month. Materials of this kind are usually miscellaneous supplies, such as molasses, facing, flour, small hardware. From the cost and accounting standpoint it is best for every foundry to draw up a list of all materials of this nature, and as soon as the invoices covering these materials are received and O. K.'d the face value of the invoices should be immediately charged off into the proper subdivision of the expense section of the foundry cost operations for that period.

At the end of each month the accumulated totals of these items will be posted to the monthly cost sheet.

Invoices covering heavy materials, such as the different kinds of metals, coal, coke, sand, lumber, should be charged into a general foundry stores account, and a stock ledger account in card form should be kept of each different kind. These ledger cards will be debited in the first place with an inventory of the quantity on hand, and thereafter with the quantities as they are received.

A daily melt record must be kept showing in detail and by actual weight the quantities of the different kinds of materials which have passed over the cupola floor. This daily record must pass promptly to the cost department, and the quantities shown must be posted to the credit side of the ledger card covering that particular material.

In the case of all heavy materials which do not pass over the cupola floor methods must be provided for daily records of quantities used. Take sand, for example. Pads should be nailed up in a convenient place in the path of the employee whose business it is to transport the sand from the sand bins into the foundry proper. Each time a load of sand is carried in a mark must be made on the pad. The capacity of the wheel barrow or other conveyance is known and the quantities used may thus be easily obtained. These records must also be transmitted to the cost department and corresponding entries made on the ledger cards.

The ledger accounts must be closed each month, and the quantities of metals used will constitute the gross melt for the month under the "Metals melted" section of the cost sheet. The quantities used of all other heavy materials will be carried into the proper subdivision of the "Expense" section of the cost sheet. These card ledger accounts must be periodically checked up with the actual quantities on hand, and thus constitute one check on the accuracy of the daily reports. In brass foundries particularly the importance of this close check on materials cannot be overestimated.

Productive and Nonproductive Labor.

The pay roll must be divided into two general classes, productive and nonproductive. From a cost keeping standpoint productive labor includes only such labor as is capable of being charged direct to a certain casting or job.

The importance of distinguishing productive labor must be emphasized, because in analyzing your costs the productive hour or the productive dollar is the acknowledged unit of distribution for all foundry expense or burden-dollars. Labor of this kind will be made up principally from the money paid to molders, but in some cases will include helpers and core makers.

Nonproductive labor is all labor, including clerical work, which for any reason whatever is incapable of being charged to a particular casting or job. In every foundry there are a certain number of general utility men who are really direct producers, but who spend only two or three minutes consecutively on any particular casting or job.

From a clerical and practical standpoint it is not often feasible to attempt to charge two or three minutes to a certain casting, and for this reason all such work must be classed as nonproductive and included in the

* From a paper read before the American Foundrymen's Association, New York, June, 1905.

proper subdivision of the expense section of the cost sheet.

In addition to the material and labor distribution to the expense section there must be charged in each month a fixed sum which is one-twelfth of the total amount of private pay roll, insurance, taxes, interest, depreciation and all other items incapable of direct distribution.

The cost sheet is then ready for certain final postings, which must come from the monthly production sheet described below:

A Daily Record of Production

must be kept which will give—

1. The gross quantity of salable castings produced.
2. The gross quantity of foundry tools and temporary equipment produced.
3. The gross quantity of bad castings returned from machine shop or customers.
4. The gross quantity of bad castings detected in foundry.
5. The gross quantity of gates, sprues, runners, &c., made.

The accumulated totals of these items posted to the proper divisions of the monthly production sheet give the gross pounds which can be accounted for out of the metals melted and the pounds lost in melting. The totals of items 2, 3, 4 and 5 must then be credited to the cost sheet record of gross melt, and in this way an amount is developed showing the net number of pounds actually used to produce the net quantity of salable castings. Reducing these weights to dollars and cents and combining with labor and expense data on cost sheet gives you the cost of your product and your loss or gain.

If the production sheet is properly designed it will establish beyond doubt the reason for any fluctuation in cost one month as against another. This method of working the cost down from gross metals melted to net quantities and values is an absolute check against serious error, whether clerical or physical. For instance, suppose the figures show a greater quantity of salable castings produced than pounds of net material used, or suppose a loss in melt is developed of more than 7 per cent. In the first case, if the error is merely physical your costs are seriously affected. Or if you are operating on a piece work basis you may have paid for more castings than have actually been produced.

In the second case, the error may be physical, or there may be serious trouble with your cupola. In either case the subject requires careful consideration and investigation. A close scrutiny of all the facts set forth on these monthly reports will likewise give the foundryman a line on the actual efficiency and condition of the entire foundry.

Analyzing Costs.

In the large iron foundry comprising green sand, dry sand, loam and machine departments it is necessary that the daily reports and records provide for a distribution of labor, castings produced and castings lost by departments. In the jobbing foundry it is important to know the relative value of each customer's business. To establish these facts it is necessary to accumulate the total number of productive hours or the total productive labor value expended on all work for the customer during a given period.

The cost of the net material used per pound is shown by the monthly cost sheet, as is also the hourly or percentage rate of expense. These units may be readily converted into total dollar expenditures, giving the entire cost of the product up to your shipping office door. To know the cost of particular castings or any class of castings the foundryman must have a record of the actual productive labor, in hours or money, expended on the castings. With this fact established the total cost is figured in the same manner as outlined in the previous paragraph.

In brass foundry work the cost of the net material used will vary according to the value of the different mixtures; otherwise the general method of figuring is the same as outlined above.

Foundry Orders.

The foundry order system should be so designed that the initial entry will by one writing (1) constitute the permanent office record; (2) advise the pattern shop to prepare the patterns and deliver them to a certain molder; (3) advise the core shop of the number of cores required and to whom to deliver them; (4) authorize the molder to proceed with the work, tell him when delivery is required, and provide him with a place to record the number of good and bad castings which he produces; (5) give complete shipping instructions to the shipper; (6) act as a tracer notifying the office of (a) the date of delivery of pattern to foundry; (b) molder to whom work has been assigned; (c) date of final delivery of cores; (d) date of completion of order by molder; (e) final date of shipment.

The foundry manager is in this way at all times in touch with every order which has been issued and can answer inquiries with the least possible delay. A system of this kind is so elastic that it permits each foundry manager to arrange it to cover conditions which may be peculiar to his foundry alone. Furthermore, the order system is closely allied to the method of analyzing costs and warrants careful thought and attention.

Patterns.

Every foundry manager realizes the importance of a quick handling of patterns. To facilitate this work all patterns received by the foundry should be catalogued, preferably in card form. The catalogue should give a complete description of the patterns and the core boxes, stating the number of pieces in each.

The pattern storage loft should be divided into sections, bins and shelves and numbered or lettered. On the receipt of a pattern it should be assigned to a permanent resting place in the storage loft, and letters or numbers indicating the location should be marked on each part of the pattern. At the same time the location is entered on the catalogue card.

In many foundries to-day there is an annual leakage of a great many dollars because of the crude and unsystematic manner of handling patterns. Lack of system here places the foundry at the mercy of one or two men who may happen to remember that such and such a pattern was originally stored in a certain section. Shipments are many times delayed and errors are invited, with a consequent feeling of annoyance and irritation reaching from the manager to the shipper.

Again, what will be the loss to the foundry, measured in dollars and cents, if the foundry should be deprived of the services of the man who carries the information in his head? With the patterns properly marked and catalogued the pattern storage loft becomes an automatic machine which may be operated by any employee who can read numbers and letters.

Inspection.

Valuable information will be obtained from the proper record of bad castings. It is always to the advantage of the manager to have a positive record of the relative value of his workmen. This information comes primarily from the inspector or from the employee acting in that capacity.

For this purpose "Castings rejected" slips are issued by the inspector for each casting lost. These slips authorize the workman to reproduce the castings when necessary, act as a notification to the office to deduct the amount from the workman's pay if the work is piece work, and, finally, are so treated in the office that a true record of the value of the workman is obtained. In times of business depression or internal trouble and discontent these individual records may be effectively used by the management.

Chemical Analysis.

The importance of a periodical chemical analysis of the metals melted and the product obtained is now so thoroughly recognized that it is hardly necessary to discuss the subject. The chemist not only keeps the foundryman from getting into trouble in his mixtures, but may reduce the costs by recommending that a greater percentage of scrap may be put into the mixture because the metal people occasionally ship materials running

higher in certain chemical properties than called for in your order.

The cost department should prepare a set of statistics so arranged that the most important points of the cost and production sheets may be compared from month to month in deadly parallel columns. These statistics should cover the entire fiscal year on one form, and in addition to data of cost, &c., should record ratio of coal and coke to metals melted, average number of producers and non-producers, average number of days worked, and all other data of importance to the management.

This paper is designed to cover in a general way the vital points which have to do with any and all foundries. In the actual installation and operation of a system there are always local conditions which require individual treatment and consideration, but the skeleton or framework is identical in almost every case.

Heads of Machine Screws.*

BY H. G. REIST, SCHENECTADY, N. Y.

The size and shape of machine screw heads as made by different manufacturers vary very greatly. In the case of screws made by some manufacturers the heads used on different sizes have different proportions, thus presenting a different appearance. The company with

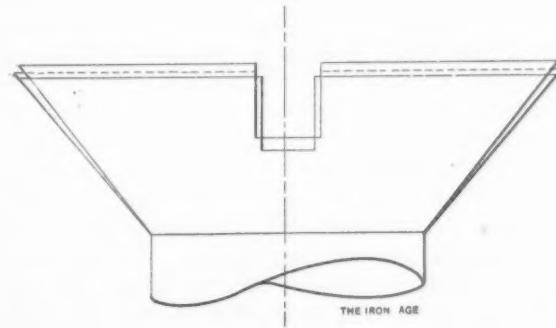


Fig. 1.—Showing the Present Variation and Proposed Design for Flat Head Machine Screws.

which the writer is connected is a large consumer of machine screws, and this variation has from time to time caused great inconvenience. Frequently designs are made to suit the screw heads of one manufacturer, and if after-

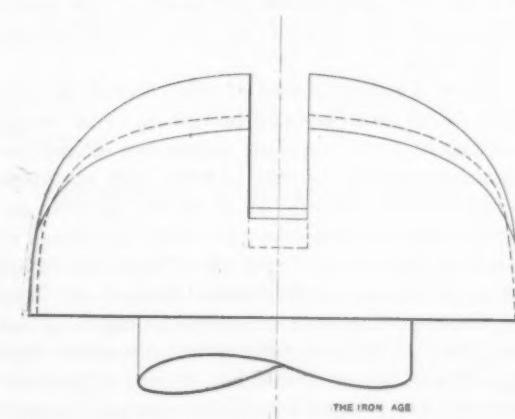


Fig. 2.—Showing the Same for Round Head Machine Screws.

ward it becomes desirable to purchase screws manufactured elsewhere there may be an interference with other parts of the machine due to the variation in size of heads. When fillister head screws were used with the space for the heads counterbored it was necessary to make the counterbore large enough to take the maximum size of head, thus not making a good appearance when smaller heads were used. The same was true in the case of flat headed machine screws. The subject was taken

* A paper presented at the Scranton meeting (June, 1905) of the American Society of Mechanical Engineers.

up with several manufacturers of machine screws and it was found that they had no defined standard, but were open to suggestions and were willing to supply screw heads to any ordinary dimensions without much if any extra cost. The extreme variation in dimensions found is shown graphically in the accompanying drawings by

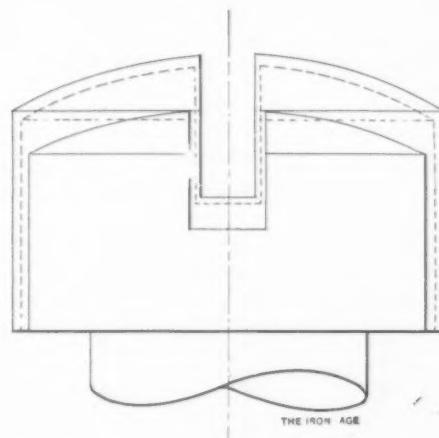


Fig. 3.—Showing the Same for Fillister Head Machine Screws.

full lines, from which it will be seen that there is great irregularity, and, as stated above, the same manufacturers will in some cases supply larger heads proportionally than others. (See Figs. 1, 2 and 3.)

In order to establish uniformity in our own works we

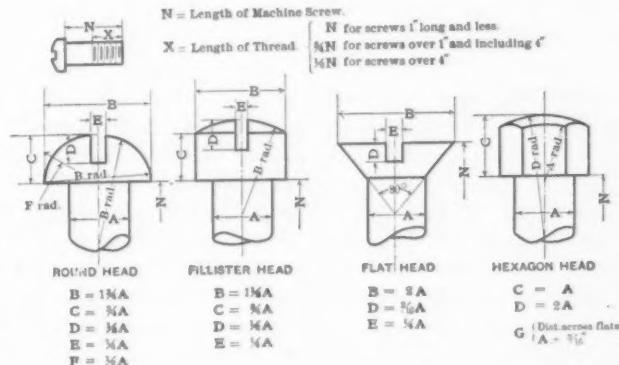


Fig. 4.—Formulas for the Design of Machine Screws After the Proposed Standard.

prepared the accompanying formula and table giving the shapes and dimensions of the heads of the size of screws ordinarily used. The shape and proportional dimensions of these heads are shown by the broken lines in the drawings of the several forms of screw heads. It will be seen

DIMENSIONS OF STANDARD MACHINE SCREWS.

Size of Screw. No. of Threads.	ROUND HEAD DIMENSIONS.						FILLISTER HEAD DIMENSIONS.					FLAT HEAD DIMENSIONS.			
	A	B	C	D	E	F	A	B	C	D	E	A	B	D	E
0	.056	.102	.044	.029	.015	.069	.064	.087	.044	.029	.015	.068	.116	.017	.015
1	.071	.124	.055	.036	.018	.089	.071	.107	.063	.036	.018	.071	.142	.021	.018
2	.064	.134	.068	.044	.025	.044	.085	.128	.066	.044	.028	.085	.176	.028	.022
3	.069	.173	.074	.050	.025	.050	.099	.149	.074	.050	.025	.099	.198	.030	.025
4	.076	.186	.085	.067	.029	.057	.113	.170	.086	.067	.035	.113	.220	.035	.028
5	.082	.191	.091	.073	.031	.063	.123	.186	.091	.073	.045	.123	.240	.042	.035
6	.088	.191	.095	.076	.032	.068	.126	.189	.095	.076	.048	.126	.242	.042	.036
8	.100	.223	.125	.093	.042	.088	.166	.249	.125	.093	.042	.166	.332	.050	.042
10	.100	.233	.133	.106	.048	.095	.170	.255	.133	.106	.055	.170	.340	.057	.046
12	.121	.287	.165	.111	.055	.111	.201	.352	.165	.111	.055	.201	.444	.066	.055
14	.126	.341	.185	.123	.068	.123	.246	.369	.185	.123	.068	.246	.492	.074	.068
HEXAGON HEAD DIMENSIONS.															
	J	C	D	G											
14	.91	.246	.348	.492	.434										

that these heads present a uniform appearance, and by submitting the table of dimensions we have had no difficulty in obtaining screws to the dimensions shown—in fact, the manufacturers have expressed themselves as pleased to have a standard to work to.

THE IRON AGE

1855-1905.

New York, Thursday, June 22, 1905.

DAVID WILLIAMS COMPANY,
CHARLES KIRCHHOFF,
GEO. W. COPE,
A. I. FINDLEY,
RICHARD R. WILLIAMS,

PUBLISHER

EDITORS

HARDWARE EDITOR

Quality Advertising.

Study the current iron and steel advertisements and you will find a hundred firms content with the mere announcement that they make or sell a certain product to one who offers some reason why his product deserves the buyer's attention. One unacquainted with the facts might easily conclude that the ethics of the iron and steel trade forbade more than the most formal announcement, just as do the ethics of the medical profession. Even in correspondence, and in the verbal efforts of the salesman, price is usually the first and often it is the only argument offered, and if quality is mentioned it is too often done in an apologetic way as if there was no expectation of its being believed. And yet there is such a thing as quality in iron and steel, and the mill that will produce goods of quality and will everlastingly and all the time, through every legitimate channel, talk quality will find a response from the buying world that will bring large returns.

There is a difference, for instance, between a good sheet of steel and a poor one, and the mill that will make a good sheet and will make the world know that it makes it will be able for most of the time to fix its average selling price a dollar or two a ton higher than is secured by other mills. There may be other mills making a product fully as good, but it was observed even in early scriptural times that a light hidden under a bushel were as well not lighted. The example of sheet steel is cited because it is so generally known that the fame of one Pennsylvania mill for the quality of its product endures to this day, after the lapse of many years and important changes in ownership. The name which was made a standard of value not only brought its creators a fortune, but it is to-day a valuable asset of the corporation that bought it. Any other sheet mill that will to-day produce goods of merit, and insist on their quality on all occasions, can similarly win name, fame and an enduring trade. What is true of sheets is true of almost every other product. It is perhaps particularly true of pig iron, and some day a genius will arise who will make a signal demonstration of the heretofore generally neglected possibilities of quality advertising in that product.

Almost every line of manufacture has in it some one mill whose product is cited by buyers as a standard of value that must be equaled by other sellers. In most cases this reputation for quality lies quite as much in skillful, persistent, convincing insistence on superior quality as in the actual quality of the goods themselves. Such a campaign not only influences the purchasing departments of a business, but is so far reaching that a blacksmith will actually have better success with a bar of iron in which he has faith than in one of exactly the same grade and quality which he does not know. In other words, it is better because he believes it to be better.

Every manufacturer of a machine or tool or mechanical appliance of any kind has it in his power to create a demand for his particular creation by skillfully telling the world of its peculiar advantages. Each has its points

of difference from competing makes, and it is these differences that can be made to count, even though it be to make a virtue of a necessity.

Exaggerating the Value of Inventions.

The independent inventor who works out his idea by himself, and not in the capacity of an employee of a manufacturing establishment, generally fails to see that there is an actual market price on this product of his brain, which is usually a good deal lower than the value which he has set on it in the dreams accompanying its inception. He may exaggerate the commercial value of his invention, or, what is fully as likely, he does not realize its imperfect form from the standpoint of the manufacturer. He does not discriminate between the product of his individual brain as compared to the invention which has been developed under commercial conditions by the expert engineering force of the industrial establishment, with all the usually indispensable assistance of searching experiment and test, and the suggestion of men who while not technically trained have the advantage of long and practical experience.

Inventions may be divided in a general way between those of the individual working alone and those of the group of individuals working amidst most helpful and stimulating influences and environments. Take the development of a certain part of a machine tool in an establishment devoted to the manufacture of machines of its type, an engine lathe, for example. Many brains may assist by suggestion or criticism. On the other hand, the individual who works for the same result must depend entirely upon his own capacity. Not all of his errors are distinguishable to him, no matter how patiently and well he may go over his ground. He lacks the stimulus of suggestion and criticism. The result is that when his idea goes to the manufacturer it is usually found that it must be practically reinvented. The whole idea must be gone over again, with expensive experiments and tests, until all that is left is the general principle. This condition of things operates very materially to lessen the money value of the invention, and accounts for a great many disappointments and much of the bitter complaining that the inventor has been robbed of the fruit of his brain.

The lack of a comprehension of these conditions puts a fictitious value upon patented inventions. One recent case was that of a screw wrench which was offered for sale to a manufacturer. An offer of \$2000 cash was made for the patent. The inventor stood out for \$10,000, declining to accept anything less. He went the round of wrench manufacturers and found them interested in his idea but not to the extent of financial investment. The inventor failed to comprehend that the trouble was not with his idea, which was sufficiently meritorious, but with the certain cost of developing it to a commercial basis and with the expense entailed in making a market for a new tool. The \$2000 which had been offered was not too little. The inventor looked upon it as the total cost to the manufacturer who offered it. As a matter of fact, the cost would probably have been in excess of the \$10,000 at which the inventor held his patent before a market would finally have been made. The redesigning of the wrench, the making of special tools, the working up of the demand and other items would foot up very rapidly. This inventor still has his patent. There are a great many others like him. Hundreds of useful ideas are thus locked up.

Modern conditions of manufacturing and marketing

goods have very materially changed the value of the ordinary useful invention. The cost of the article must be kept within the limits of its class, which cannot be done without capital with which to provide economical methods of production. The inventor can rarely manufacture at a profit, unless he has capital and business acumen, as well as some knowledge of the particular branch of the trade. The invention that will revolutionize a demand is very rare. An improvement is often useful, but it is rarely indispensable, and although having a real value the value may not be sufficient to warrant changing a great line of product until perhaps other improvements may be coupled with it to produce a radical and demand creating advantage.

The proper method of procedure for the inventor who has an idea for sale is to go into the market and get the best price he can. If in the case of the wrench the inventor had accepted the \$2000 he would have had some money, he would have eased his mind of the rankling sense of unappreciated genius and could have gone to work on some other invention which might yield more because it might find a less crowded niche in the industrial edifice. This is the principle upon which the manufacturer of special machinery builds his prosperity. He may receive an unsolicited order for a machine to accomplish a given work, or he may suggest to a manufacturer a machine that would cut the cost of production. The machine may contain wonders of ingenuity, even genuine genius. This is very often true. Such a machine is more valuable than many a device which the inventor believes to be worth many thousands of dollars. Yet it brings the market value, which is pretty certain to be a great deal less than what the class of inventors referred to would regard as robbery. The manufacturer of special machinery is satisfied with a substantial profit. He goes to work on other machines, seeking a profitable total of results instead of harboring the belief that a single idea should make him independently rich.

The inventor may rest assured that if he has discovered an idea so valuable as to be worth a great deal of money those to whom it would be a great trade advantage will not consent to a competitor obtaining it without a struggle. The market value will be a high one. Consequently the rule should hold, with a possible exception now and then, that the inventor's creation has its value, which will be regulated by the demand, and the demand will set the price at pretty nearly what it should be.

The German Commercial Treaties.

It appears that German business men do not look with entire favor on their new commercial treaties. The Association of Saxon Manufacturers has written to its members asking their opinion as to the probable effects of these treaties upon the manufacturing and exporting interests of Germany. Of the 357 firms which have so far sent in replies, 9 expect favorable results, 97 think that present conditions will not be much affected thereby, and 251 believe the export trade will be seriously injured, and to some countries will become almost impossible. The convention of merchants at Bremen has declared in favor of continuing "the most favored nation" clause with other countries, as otherwise they believe that tariff wars might ensue which would injure Germany's shipping interests and her manufacturing and export trades and result in giving her competitors great advantages in foreign markets. Further, according to a report of the United German Engine Manufacturers,

numbering about 160 of the most prominent makers, it is feared that a considerable reduction will be experienced through the new commercial treaties. This phase of the subject is of decided interest, as it had been supposed that the new German treaties were drawn up for the express purpose of increasing the outlet for German manufacturers.

Engine Efficiency and Superheated Steam.

Elsewhere in this issue will be found an account of a test on a compound engine using superheated steam which shows record breaking results. The greatest interest attaches to this test from the fact that it indicates the possibility of improving the performance of the reciprocating engine. It is well known that before the performance of the steam turbine approached that of the reciprocating engine it was found necessary to supply the turbine with superheated steam. With that provision the conditions were favorable and some very fair water rates were obtained. These were compared with the best records of reciprocating engines made with saturated steam, but in justice to the older form of prime mover it is only fair to investigate its ability when working under conditions equivalent to those demanded by turbine builders.

The test referred to is decidedly remarkable in many respects and will establish some new precepts in reciprocating engine practice. It has ordinarily been considered too expensive to provide a separately fired superheater. Just what the actual results are in the economy of plant operation has not been explained, but it is unlikely that the proprietors of the mill would have installed it, or at any rate continued it in operation, unless the financial returns had been satisfactory. Another feature deserving special notice is that the engine, contrary to general belief, remains in perfect condition after a year's continuous operation with highly superheated steam. Evidently superheated steam is not as destructive to the parts of the reciprocating engine as was once believed, or else improved materials and workmanship have successfully combated its deleterious effects. Another point which should be noticed is that the cylinders were not provided with jackets. This would seem to settle for all time the disputed question as to whether or not any real benefit accrues from the use of steam jackets. And, still further, it must be remembered that this was a compound engine, with only two cylinders, and yet it has beaten the best record ever made by a triple expansion engine.

All in all, this test has thrown new light on a number of debated questions. It remains to be seen whether multiple expansion engines, beyond those of two-cylinder form, and steam turbines can come up to the new standard set by this unjacketed compound engine using superheated steam at comparatively moderate pressure.

The E. W. Bliss Company, Paris, has been organized, with a capital stock of \$150,000, by the E. W. Bliss Company, Brooklyn, N. Y., to take over the management of the Clichy works of the company, which are situated near Paris, France. The Clichy works have been in operation for some time manufacturing Bliss products, and the business in France has been so successful that it was decided to organize a separate company to operate the plant. While the Bliss interests will predominate in the management of the new company, other capital is interested to a small extent. About 100 hands are employed at present in the plant, and it is expected that the new company will branch out and invade the foreign field. The company makes sheet metal working machinery.

CORRESPONDENCE.

The Volume of Air Required in Cupola Practice.

To the Editor: In the article by W. J. Keep on the "Cupola System of the Michigan Stove Company," which appeared in *The Iron Age* for June 8, there are some apparently phenomenal results obtained for which no adequate explanation is given. The writer believes that it is usual practice among the makers of positive blowers to allow a displacement of 30,000 to 33,000 cubic feet for each ton of iron to be melted. This, however, does not mean that 30,000 cubic feet of air is necessary for the production of 1 ton of iron. The amount of slip due to leakage, &c., in the positive blowers varies from 15 to 20 per cent., depending upon pressure, condition of blower, &c., so that there is a volumetric efficiency of from 80 to 85 per cent.—that is, the actual allowance is only from 24,000 to 25,500 cubic feet of air per ton of iron produced.

This is evidently much below the amount theoretically required for the perfect combustion of the coke, but as a matter of fact the combustion never can be perfect in a cupola. One pound of carbon burned to carbon dioxide (CO_2) requires 12 pounds of air for perfect combustion, while 1 pound of carbon burned to carbon monoxide (CO) requires only 6 pounds of air for perfect combustion. The average grade of coke contains about 90 per cent. carbon, so that the air required per pound of coke in the first case would be 10.8 pounds, and in the second case 5.4 pounds.

Now a large number of tests have conclusively shown that the gases from cupola contain about equal parts of CO_2 and CO gases and that the oxygen is completely utilized—that is, 50 per cent. of the carbon is burned to CO_2 and 50 per cent. to CO—and therefore the average amount of air required per pound of carbon would be $(12 + 6) / 2 = 9$ pounds, and the average air required per pound of coke would be 8.1 pounds instead of 11, as given by Mr. Keep, and 105 cubic feet of air instead of 143 (taking the air at a temperature of 55 degrees, or 13 cubic feet of air per pound). Frequently the amount of air required per pound of coke may be even lower than this, owing to a higher percentage of carbon dioxide gas or to a larger percentage of ash in the coke.

This explains the apparent discrepancy in the capacity of the blower and in the theoretical amount of air required as given by Mr. Keep. So, instead of requiring theoretically 32,400 cubic feet of air per ton of iron with a ratio of 8.8 to 1, we will have 23,800 cubic feet of air per ton of iron, or possibly less. It should be noted, however, that Mr. Keep gives the displacement of the blower at about 26,220 cubic feet per ton of iron, which would give an efficiency of not more than 90 per cent., with a possibility of it being less, as previously noted. It should also be observed that in figuring the theoretical amount of air required no account has been taken of the amount of coke remaining after dropping the bottom. This should have been deducted from the total in figuring the theoretical amount of air required and would have the effect of reducing this quantity considerably.

Again, using the figures of Mr. Keep, the writer finds that the displacement of the blower is 12,450 cubic feet per minute, while the maximum requirement of air is not over 11,300 cubic feet of air per minute. Revising the table given for the horse-power required to drive the blower at various pressures, we have:

Pressure at blower. Ounces.	Indicated horse-power to drive blower.		Theoretical horse-power mechanical to drive blower.		Per cent. efficiency of blower.	Per cent. total efficiency of blower.
	13	50	44.2	88.2		
18	72	61.2	85	76.5 to 68		
23	87	78.1	90	81 to 72		

The correct efficiencies for the blower will lie between the maximum and minimum values given in the last column and correspond to a volumetric efficiency lying between 80 and 90 per cent. It should be noted that the efficiency given by Mr. Keep are merely mechanical efficiencies, which take into account only the friction of the blower, but do not consider the loss in volume due to leakage, which is the largest item. It should also be noted that slight corrections are necessary in the theoret-

ical horse-power and in the efficiency as computed by Mr. Keep. However, the results after making these corrections are, as Mr. Keep states, unusually good.

W. H. CARRIER.
BUFFALO, N. Y., June 14, 1905.

Labor Notes.

The report of the officers of the Alabama division of the United Mine Workers shows that during the year ending April 30, 1904, the receipts amounted to \$486,344.16 and the disbursements to \$440,940.75. The amount paid for provisions to maintain the coal miners' strike was \$365,284.33. The national miners' organization subscribed \$360,737.57 and \$21,984.05 was paid to return to their former homes 1563 nonunion men who had come into the district.

The Youngstown Sheet & Tube Company, Youngstown, Ohio, will sign the puddling and finishing scales as agreed upon between the Republic Iron & Steel Company and the Amalgamated Association. The company will further be governed by action taken in the conference on the sheet mill scales.

The strike inaugurated about two weeks ago in 15 of the foundries in the New York district which are members of the New York and New Jersey Foundrymen's Association is gradually fizzling out, the strikers in six of the foundries having already gone back to work under the old agreement. The other foundries are working fairly well with nonunion men. In none of the foundries did the molders or core makers go out. The International Brotherhood of Foundry Employees, which called out its members, is made up entirely of helpers and laborers, and from the fact that the molders' and core makers' unions did not strike in sympathy, it is evident that the strike was not justified. The companies whose foundries are at present affected by the strike are the Acme Foundry Company, E. W. Bliss Company, Richey, Browne & Donald; John J. Riley and H. Youbelman, Brooklyn; E. Ferguson & Son, Hoboken, N. J.; Cameron Steam Pump Company, Benjamin Fox and White Mfg. Company, New York. At the following foundries the men have returned to work under old terms: Bell & Fyfe Mfg. Company, Brooklyn Foundry Company, Henry C. Fischer, John May and Smith & Loughlin, Brooklyn, and Steele & Condit, Jersey City.

The puddlers formerly employed at the lower mills of the Carnegie Steel Company, Youngstown, Ohio, but who have been on strike for several months, have petitioned the Amalgamated Association to be allowed to return to work and retain their membership in this organization. It is probable the men will be allowed to do this, as the strike at this plant has been hopelessly lost for months.

It is claimed by manufacturers of other kinds of stay bolts that sufficient opportunity was not given to them to secure proper consideration of the matter when the recent convention of the Master Steam Boiler Makers' Association in Chicago officially adopted elastic stay bolts. The assertion is made that representatives of manufacturers of other stay bolts were by a ruse induced to leave the hall when this question came up. If the facts are correct as thus stated it would appear that the officers of the association should take the proper steps to have an investigation made. No association which values its standing in the trade can afford to have its approval placed upon a question of such importance without careful consideration.

Regular shipments of iron ore are being made from Minnesota mines to the furnaces of the Algoma Steel Company at Sault Ste. Marie, Ont., and to those of the Dominion Iron & Steel Company at Sydney, Cape Breton. The cargoes to Sydney are limited by the draft and the size of the locks in the Welland Canal to 2000 to 2200 tons. English vessels have been engaged in this trade.

American Iron and Steel Production in 1904.

The annual statistical report for 1904 of the American Iron and Steel Association, which has just come from the press, contains detailed statistics of the production of iron and steel in various forms in the United States last year. A number of new features appear, including unusual details of the statistics of rail production in 1904. Tables are given showing the price of Bessemer steel rails in this country and in Great Britain for a long series of years, and also showing the miles of railroad in operation in the United States since 1830 and the displacement of iron rails by steel rails since 1880. Below we give an abstract of the principal statistical features of the report:

Pig Iron Production.

The production of pig iron in 1904 was 16,497,033 gross tons, against 18,009,252 tons in 1903, a decrease of 1,512,219 tons. The consumption of pig iron in the last three years is shown approximately in the following table. Warrant stocks not controlled by the makers are included in unsold stocks for each year:

Pig Iron.—Gross tons.	1902.	1903.	1904.
Domestic production.....	17,821,307	18,009,252	16,497,033
Imported	619,354	599,574	79,500
Stocks unsold January 1.....	73,647	49,951	598,489
Total supply.....	18,514,308	18,658,777	17,175,022
Deduct stocks December 31..	40,951	598,489	446,442
Also exports.....	27,487	20,379	49,025
Approximate consumption.	18,436,870	18,039,909	16,679,555

Although the production of pig iron in 1904 fell below that of 1903 by 1,512,219 tons, the consumption in 1904 was only 1,360,354 tons less than in 1903, the stocks of unsold pig iron at the close of 1904 being 152,047 tons less than at the close of 1903, while imports of pig iron greatly declined in 1904.

The limestone consumed for fluxing purposes by the blast furnaces of the United States in the production of 16,497,033 tons of pig iron in 1904 amounted to 8,195,036 tons. The average consumption of limestone per ton of all kinds of pig iron produced was 1112.6 pounds in 1904, against 1193 pounds in 1903, 1192.8 pounds in 1902, 1186.5 in 1901 and 1205.6 pounds in 1900. The consumption in 1904 by the anthracite and bituminous furnaces was 1128 pounds per ton of pig iron made, and by the charcoal furnaces it was 373.6 pounds.

Production of Pig Iron by Grades.

The following table gives the total production of pig iron in the United States in 1902, 1903 and 1904 by grades:

Grades.—Gross tons.	1902.	1903.	1904.
Bessemer and low phosphorus.	10,393,168	9,989,908	9,098,659
Basic (mineral fuel).....	2,038,590	2,040,726	2,483,104
Forge pig iron.....	833,003	783,016	550,836
Foundry and high silicon.....	3,851,276	4,409,023	3,827,229
Malleable Bessemer.....	311,458	473,781	263,529
White, mottled, &c.....	172,085	120,137	53,284
Spiegeleisen	168,408	156,700	162,370
Ferromanganese	44,573	35,961	58,022
Direct castings.....	8,656	.....	.....
Totals.....	17,821,307	18,009,252	16,497,033

The Bessemer figures include low phosphorus pig iron—that is, iron running below 0.04 per cent. in phosphorus. Pig iron containing from 0.04 to 0.10 per cent. of phosphorus is classified as Bessemer. The basic figures are confined strictly to pig iron made with mineral fuel, and do not include the small quantity of basic iron that is annually made with charcoal. A few thousand tons of castings direct from the furnace are included in the totals for white and mottled and miscellaneous grades of pig iron for 1903 and 1904. Ferrosilicon and high silicon pig iron are included in the foundry figures. Small quantities of ferrophosphorus are included with ferromanganese for 1902 and 1904.

In 1904 the production of Bessemer pig iron alone, omitting low phosphorus pig iron, amounted to 8,907,713 tons, against 9,789,486 tons in 1903 and 10,228,922 tons in 1902. The production of low phosphorus pig iron amounted to 190,946 tons in 1904, against 200,422 tons in 1903 and 164,246 tons in 1902. In 1900 and 1901 the

production of low phosphorus pig iron was not separately ascertained. In 1904 low phosphorus pig iron was made in New York, Pennsylvania and Tennessee.

Of the total production of pig iron in 1904 over 55.1 per cent. was Bessemer and low phosphorus, as compared with over 55.4 per cent. in 1903; nearly 23.2 per cent. was foundry, against 24.4 per cent. in 1903; 15 per cent. was basic, against over 11.3 per cent. in 1903; 3.3 per cent. was forge; 1.3 per cent. was spiegeleisen and ferromanganese, and almost 1.6 per cent. was malleable Bessemer. White and mottled and miscellaneous grades and furnace castings did not amount to 1 per cent. in 1903 and 1904.

Included in the 3,827,229 tons of foundry pig iron made in 1904 are 69,730 tons of ferrosilicon, made in Pennsylvania, Virginia, West Virginia, Kentucky and Ohio, a small part of which was made with electricity. In 1903 51,516 tons of ferrosilicon were made. Pig iron containing 7 per cent. of silicon and over is classified as ferrosilicon. Virtually all the charcoal iron made is classified as foundry pig iron. Alabama is now the leading producer of foundry pig iron and Pennsylvania of forge pig iron.

The production of malleable Bessemer pig iron in 1904 amounted to 263,529 tons, against 473,781 tons in 1903, 311,458 tons in 1902 and 256,532 tons in 1901. In 1904 the production of white and mottled and other miscellaneous grades of pig iron and direct castings amounted to 53,284 tons, against 120,137 tons in 1903, 180,741 tons in 1902 and 96,546 tons in 1901.

The production of spiegeleisen, ferromanganese and ferrophosphorus by States in 1903 and 1904 was as follows:

States.—Gross tons.	Sbiegeleisen.		Ferromanganese and ferrophosphorus.	
	1903.	1904.	1903.	1904.
New Jersey.....	15,346	11,242	...	...
Pennsylvania	76,493	103,773	34,871	57,076
Tennessee .....	...	...	...	946
Alabama	24	...	1,090	...
Illinois	57,955	39,799	...	...
Colorado	6,882	7,556	...	...
Totals.....	156,700	162,370	35,961	58,022

As a rule spiegeleisen contains from 9 to 22 per cent. of manganese, and ferromanganese from 45 to 82 per cent. The standard for spiegeleisen is 20 per cent. and for ferromanganese it is 80 per cent.

The United States annually produces only a few thousand tons of manganese ore—11,771 tons in 1900, 11,995 tons in 1901, 7477 tons in 1902, 2825 tons in 1903 and 3146 tons in 1904. Our supply of manganese ore is mainly derived from foreign sources. The following States produced manganese ore in 1903; California, 16 tons; Georgia, 500 tons; South Carolina, 25 tons; Utah, 483 tons, and Virginia, 1801 tons; total, 2825 tons. The imports of manganese ore have been as follows in late years: In 1897, 119,961 tons; in 1898, 114,885 tons; in 1899, 188,349 tons; in 1900, 256,252 tons; in 1901, 165,722 tons; in 1902, 235,576 tons; in 1903, 146,056 tons; in 1904, 108,459 tons.

The Bureau of Statistics of the Department of Commerce and Labor gives the quantities and values of ferromanganese, spiegeleisen and ferrosilicon imported for consumption in the calendar years 1903 and 1904 as follows:

	1903.		1904.	
	Gross tons.	Values.	Gross tons.	Values.
Ferromanganese	41,518	\$1,699,666	21,814	\$707,037
Sbiegeleisen	122,016	2,709,317	4,623	132,461
Ferrosilicon	14,880	379,900	3,691	184,229
Totals.....	178,414	\$4,788,883	30,128	\$1,023,727

The report estimates the total consumption of domestic and foreign iron ore in the manufacture of pig iron in 1904 at 28,870,000 gross tons, against 31,516,000 tons in 1903, 31,187,000 tons in 1902, 27,787,000 tons in 1901 and 24,131,000 tons in 1900. The mill cinder, scale, scrap, &c., consumed in the manufacture of pig iron in the census year 1900 amounted to 1,600,313 tons. Our production of pig iron in the census year was 14,452,234 tons. To the above estimates may be added the iron ore annually consumed in open hearth steel furnaces and in rolling mills, &c., which amounted in the census year 1900 to 340,028 gross tons.

Production of Bessemer Steel.

The total production of Bessemer steel ingots and castings in the United States in 1904 was 7,859,140 tons, against 8,592,829 tons in 1903, a decrease of 733,689 tons, or 8.5 per cent. The production in 1903 was 545,534 tons less than in 1902, in which year the production was the largest in our history. The following table gives the production of Bessemer steel ingots and castings in the last four years by States. Of the production in 1904 16,051 tons were direct castings, against a similar production of 18,099 tons in 1903 and 12,548 tons in 1902:

States.	Gross tons.	1901.	1902.	1903.	1904.
Pennsylvania	4,293,439	4,209,326	3,909,436	3,464,650	
Ohio	2,154,846	2,528,802	2,330,134	2,050,115	
Illinois	1,324,217	1,443,614	1,366,569	1,257,190	
Other States	940,800	956,621	986,690	1,087,185	
Totals	8,713,802	9,138,363	8,592,829	7,859,140	

There were no Clapp-Griffiths works in operation in 1904 and only two Robert-Bessemer plants were active. Eleven Tropenas plants were at work, as compared with eight in 1903. In addition two plants made steel by the Bookwalter process and five plants in special converters. With the exception of the Clapp-Griffiths plant all these works make a specialty of steel castings.

The following table gives separately the production of Bessemer steel ingots and castings from 1898 to 1904, all made by the acid process. Prior to 1898 Bessemer castings were included with ingots. Basic Bessemer steel has not been made in this country since 1897, when about 69,000 tons of ingots were produced at Troy, N. Y., by the Troy Steel Company:

Years.	Gross tons.	Ingots.	Castings.	Total.
1898		6,605,478	3,539	6,609,017
1899		7,582,415	3,939	7,586,354
1900		6,678,303	6,467	6,684,770
1901		8,706,538	6,764	8,713,302
1902		9,125,815	12,548	9,138,363
1903		8,574,730	18,099	8,592,829
1904		7,843,089	16,051	7,859,140

New Bessemer Steel Casting Plants.

No new standard Bessemer plants were built in 1904. Nor was work commenced on any new standard Bessemer plants during that year. A number of works to make steel by the Tropenas process were, however, completed and put in operation in 1904. Also one plant to make steel by the Bookwalter process and one plant to make steel in a special Bessemer converter.

The new Tropenas plants which were built and put in operation in 1904 were as follows: Watertown Arsenal, Watertown, Mass.; one 2-gross ton converter; first steel made March 25, 1904. Massachusetts Steel Casting Company, Everett, Mass.; one 2-gross ton converter; first steel made December 29, 1904. Providence Steel Casting Company, Providence, R. I.; one 2-gross ton converter; first steel made in May, 1904; foundations are now ready for an additional 2-gross ton converter, which may be completed in 1905. United States Navy Yard, Brooklyn, N. Y.; one 2-gross ton converter; first steel made December 19, 1904. Southern Steel Works, Chattanooga, Tenn.; one 2-gross ton converter; first steel made December 1, 1904. In addition to the above Isaac G. Johnson & Co., Incorporated, of Spuyten Duyvil, N. Y., added one 2-gross ton Tropenas converter to its plant in the summer of 1904, and its works are now equipped with two 2-gross ton converters.

The new plant to make steel by the Bookwalter process was erected by the Brylgon Steel Casting Company, at New Castle, Del. It is equipped with two 2-gross ton converters. Steel was first made on September 22, 1904. The plant to make steel in a special converter was built by the Milwaukee Steel Foundry Company, at Milwaukee, Wis. Steel was first made on March 15, 1904. The converter has a capacity of 1 ton at each blow.

All the plants enumerated above make a specialty of steel castings, although occasionally a few ingots are made. Some of these ingots are used in the production of forgings.

Production of Open Hearth Steel.

The total production of open hearth steel ingots and direct castings in the United States in 1904 was 5,908,166 gross tons, against 5,829,911 tons in 1903, an increase of 78,255 tons, or over 1.3 per cent. While this increase

was not so great as had been looked for, it should be remembered that any increase at all in a year which witnessed a general reaction in business, and especially in the iron trade, marks an important advance in the open hearth branch of our iron and steel industries. The following table gives the production of open hearth steel ingots and castings by States since 1901 in gross tons:

States.	Gross tons.	1901.	1902.	1903.	1904.
New England	170,876	179,923	169,209	195,901	
New York and New Jersey					
Jersey	82,985	92,763	104,598	165,986	
Pennsylvania	3,594,763	4,375,364	4,442,730	4,306,498	
Ohio	184,943	278,854	369,349	480,906	
Illinois	398,522	435,461	422,919	358,215	
Other States	224,220	325,364	321,106	400,660	
Totals	4,656,300	5,687,729	5,829,911	5,908,166	

The open hearth steel made in 1904, including both ingots and castings, was produced by 116 works in 16 States—Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, Tennessee, Alabama, Ohio, Indiana, Illinois, Wisconsin, Missouri, Colorado and California. One hundred and eleven works in 17 States made open hearth steel in 1903, and 98 works in 16 States made open hearth steel in 1902. The production of open hearth steel ingots in 1904, excluding castings, amounted to 5,605,332 tons, against 5,429,563 tons in 1903, an increase of 175,769 tons.

Open Hearth Steel Ingots and Castings.

In the following table is given the production by States of both acid and basic open hearth steel ingots and castings in 1904. The production of open hearth steel by the basic and acid processes was first separately ascertained for the year 1896:

States.	Gross tons.	Basic open	Acid open	Total.
New England	147,390	48,511	105,901	
New York and New Jersey	139,791	26,195	165,986	
Pennsylvania	3,667,673	638,825	4,306,498	
Ohio	427,948	52,958	480,906	
Illinois	341,073	17,142	358,215	
Other States	382,492	18,168	400,660	
Totals for 1904	5,106,367	801,799	5,908,166	
Totals for 1903	4,734,913	1,094,998	5,829,911	
Totals for 1902	4,496,533	1,191,196	5,687,729	
Totals for 1901	3,618,993	1,037,316	4,656,309	
Totals for 1900	2,545,091	853,044	3,398,135	
Totals for 1899	2,080,426	866,890	2,947,316	
Totals for 1898	1,569,412	660,880	2,230,292	
Totals for 1897	1,056,043	552,628	1,608,671	
Totals for 1896	776,256	522,444	1,298,700	

In 1903 4,734,913 tons of open hearth steel were made by the basic process and 1,094,998 tons were made by the acid process, while in 1904 the production by the basic process amounted to 5,106,367 tons and by the acid process to 801,799 tons. A loss in production by the acid process in 1904 of 293,199 tons is indicated by these figures, but they also show a gain of 371,454 tons in the production of basic steel. This gain is less than the gain of 442,378 tons in 1904 in the production of basic pig iron. In 1902 there were made 4,496,533 tons of open hearth steel by the basic process and 1,191,196 tons by the acid process. These figures show a steady decline in the production of acid steel.

Production of Open Hearth Steel Castings.

The total production of open hearth steel castings in 1904, as already stated, amounted to 302,834 gross tons, of which 98,919 tons were made by the basic process and 203,915 tons were made by the acid process. In 1903 the production of open hearth steel castings amounted to 400,348 tons, of which 134,879 tons were made by the basic process and 265,469 tons by the acid process. The decrease in the production of castings in 1904, as compared with 1903 amounted to 97,514 tons, the decline in basic castings amounting to 35,960 tons and in acid castings to 61,554 tons. The following table gives the production of open hearth steel castings by both the acid and basic processes in 1904 by States:

States.	Gross tons.	Basic castings.	Acid castings.	Total.
New England, New York and New Jersey	17,193	27,285	44,478	
Pennsylvania	5,831	128,579	134,410	
Ohio, Indiana, Illinois and other States	75,895	48,051	123,946	
Totals for 1904	98,919	203,915	302,834	
Totals for 1903	134,879	265,469	400,348	

Totals for 1902.....	112,404	255,475	367,879
Totals for 1901.....	94,941	206,681	301,622
Totals for 1900.....	42,644	134,847	177,491
Totals for 1899.....	39,689	130,040	169,729
Totals for 1898.....	28,460	92,127	120,587

In addition to the States named in the table Massachusetts, Connecticut, Tennessee, Alabama, Wisconsin, Missouri and California made open hearth steel castings in 1904.

The production of crucible steel in the United States in 1904 amounted to 83,391 gross tons, against 102,434 tons in 1903, a decrease of 19,043 tons, or 18.5 per cent. Eight States made crucible steel in 1904—namely, Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, Indiana, Illinois and Wisconsin. The direct castings produced in 1904, included above, amounted to 4308 tons, against 5409 tons in 1903. Pennsylvania made 60,815 tons of crucible steel ingots and castings in 1904, against 75,437 tons in 1903. No other State made over 8500 tons in 1904 or 10,500 tons in 1903. With the exception of New Jersey all the States named made crucible steel castings as well as ingots in 1904.

The production of steel in the United States in 1904 by various minor processes amounted to 9190 gross tons, against 9804 tons in 1903. Three States made steel in 1904 by minor processes—namely, New Jersey, Pennsylvania and Indiana. Blister, puddled and "patented" steel, including "patented" steel castings, are included in these figures.

The total production of all kinds of steel ingots in 1904 amounted to 13,529,676 tons, against 14,104,713 tons in 1903, a decrease of 575,037 tons, or over 4 per cent. Fourteen States made steel ingots in 1904, against 16 States in 1903.

Of the total production of steel castings in 1904 Pennsylvania made over 41 per cent., against over 43 per cent. in 1903; Illinois over 17 per cent., against nearly 23 per cent. in 1903, and Ohio over 11 per cent., against over 12 per cent. in 1903. No other State made 10 per cent. in 1904 or 5 per cent. in 1903.

The production of all kinds of steel ingots and castings in 1904 amounted to 13,859,887 gross tons, against 14,534,978 tons in 1903, a decrease of 675,091 tons, or over 4.6 per cent. The maximum production of steel ingots and castings was reached in 1902; the year of next highest production was 1903. Puddled, "patented," and all other kinds of steel are included.

Production of Rails.

The production of all kinds of rails in 1904 amounted to 2,284,711 gross tons, against 2,902,477 tons in 1903, a decrease of 707,766 tons, or 23.6 per cent. In the following table the production of all kinds of rails in 1904 is given by States:

States.—Gross tons.	Bessemer.	Open hearth.	Iron.	Total.
Pennsylvania	801,657	20,451	...	822,108
Other States.....	1,336,300	125,432	871	1,462,603
Totals.....	2,137,957	145,883	871	2,284,711

Twenty-six plants in 13 States rolled or rerolled rails in 1904, as follows: New York, 2; Pennsylvania, 5; Maryland, 3; West Virginia, 2; Tennessee, 1; Georgia, 1; Alabama, 3; Ohio, 3; Illinois, 2; Wisconsin, 1; Kansas, 1; Colorado, 1, and Wyoming, 1. The year of maximum production of all kinds of rails was 1903; the year of next largest production was 1902.

The production of Bessemer steel rails in 1904 amounted to 2,137,957 gross tons, against 2,946,756 tons in 1903, a decrease of 808,799 tons, or over 27.4 per cent. In the following table the production of Bessemer steel rails is given in gross tons by States from 1901 to 1904. Rails rolled from purchased blooms, crop ends and "seconds," and rerolled, or renewed, rails are included.

Bessemer rails.	1901.	1902.	1903.	1904.
Pennsylvania	1,406,008	1,148,425	1,186,284	801,657
Other States.....	1,464,808	1,786,967	1,760,472	1,336,300
Totals.....	2,870,816	2,935,392	2,946,756	2,137,957

In addition to Pennsylvania the States which made Bessemer rails in 1904 were New York, Maryland, West Virginia, Georgia, Ohio, Illinois, Wisconsin, Kansas, Colorado and Wyoming. The production of Bessemer steel rails by the makers of Bessemer steel ingots, in-

cluded above, amounted to 2,084,688 gross tons in 1904, 2,873,228 tons in 1903, 2,876,293 tons in 1902, 2,836,273 tons in 1901, 2,361,921 tons in 1900 and 2,240,767 tons in 1899.

The total production of open hearth steel rails in the United States in 1904 was 145,883 gross tons, against 45,054 tons in 1903, 6029 tons in 1902, 2093 tons in 1901 and 1333 tons in 1900. The maximum production of open hearth rails was reached in 1904; prior to 1903 the year of next highest production was 1881, when 22,515 tons were made. Alabama rolled almost all the open hearth rails that were made in 1904, Pennsylvania and Colorado being the only other producers. Over 116,000 tons of the open hearth rails made weighed between 45 and 85 pounds per yard and over 8000 tons weighed 85 pounds or over; the remainder, over 21,000 tons, weighed less than 45 pounds. The production of iron rails in 1904 was 871 tons, all rolled in Tennessee and Alabama, and all weighing less than 45 pounds to the yard.

The production of rails weighing under 45 pounds to the yard in 1904 shows an increase of 70,621 tons, as compared with 1903, but the production of rails weighing 45 pounds and less than 85 pounds shows a decrease of 282,411 tons, as compared with 1903. The great falling off in the production of rails in 1904, as compared with 1903 was, however, in sections weighing 85 pounds and over to the yard, in which the decrease amounted to 495,976 tons.

Production of Structural Shapes.

The statistics of iron and steel structural shapes embrace the production of beams, beam girders, zee bars, tees, channels, angles and other structural forms, but they do not include plates or girders made from plates. Plates are provided for under other classifications, and in the general statistics of plates are included all plates cut to specifications. The total production of strictly structural shapes in 1904 was 949,146 tons, against 1,095,813 tons in 1903, a decrease of 146,667 tons. Of the total production in 1904 about 941,127 tons were rolled from steel and about 8019 tons from iron. The production in 1903 and 1904 by States was as follows:

States.—Gross tons.	1903.	1904.
New York and New Jersey.....	32,884	47,657
Pennsylvania	1,004,375	829,167
Delaware, Alabama and Ohio.....	34,191	24,284
Indiana, Illinois, Wyoming and California	24,363	48,038
Totals.....	1,095,813	949,146

Production of Wire Rods.

The production of iron and steel wire rods in the United States in 1904 amounted to 1,699,028 gross tons, against 1,503,455 tons in 1903, 1,574,293 tons in 1902, 1,365,934 tons in 1901, and 846,291 tons in 1900, showing an increase of 195,573 tons in 1904 as compared with 1903, or over 13 per cent. Of the total production in 1904 1,697,862 tons were steel rods and 1166 tons were iron rods. In 1903 the steel wire rods rolled amounted to 1,503,425 tons and iron rods to 30 tons. The maximum production was reached in 1904. The following table gives the production of iron and steel wire rods by States in the last four years:

States.—Gross tons.	1901.	1902.	1903.	1904.
Massachusetts, Conn., R. I., N. Y. and N. J.....	176,101	201,653	240,024	228,289
Pennsylvania, Kentucky, Ala. and Ohio	808,716	950,260	897,891	973,801
Indiana, Ill. and Col.	381,117	422,380	365,540	496,938
Totals.....	1,365,934	1,574,293	1,503,455	1,699,028

Pennsylvania made the largest quantity of wire rods in 1904, with Illinois second, Ohio third and Massachusetts fourth.

Production of Plates and Sheets.

The production of iron and steel plates and sheets in the United States in 1904, excluding nail plate, amounted to 2,421,398 gross tons, against 2,599,665 tons in 1903, decrease of 178,267 tons, or over 6.8 per cent. Of the total production in 1904 about 2,353,685 tons were rolled from steel and about 67,713 tons from iron. Skelp iron and steel are not included in the statistics of plates

and sheets, but are classed with hoops, bars, &c. The following table gives the production by States of all kinds of iron and steel plates and sheets in 1902, 1903 and 1904:

States.—Gross tons.	1902.	1903.	1904.
New England, N. Y. and N. J.	9,240	12,560	14,599
Pennsylvania	1,808,207	1,771,745	1,555,941
Delaware and Maryland	34,282	23,703	23,956
West Virginia	67,072	56,361	108,964
Kentucky and Alabama	56,823	40,635	44,845
Ohio	404,902	403,705	490,192
Ind., Ill., Mich., Mo., Wis., Col. and Cal.	284,883	290,956	182,901
Totals.	2,665,409	2,599,665	2,421,398

The production of iron and steel nail plate in 1904 was 61,601 tons, of which about 42,182 tons were steel and about 19,419 tons were iron. These figures are not included in the foregoing table.

Production of Black Plates and Tin Plates.

The production of black plates, or sheets, for tinning in 1904, which is included in the preceding table, amounted to 472,569 gross tons, against 490,652 tons in 1903, a decrease of 18,083 tons, or over 3.6 per cent. Of the production in 1904 Pennsylvania made over 53.4 per cent., against over 52 per cent. in 1903. Ohio, Indiana, West Virginia, Illinois, Maryland and Missouri also made black plates for tinning in 1903 and 1904 in the order named. Almost all the black plates made in 1904 were rolled from steel; only a few thousand tons were rolled from iron.

The report estimates the production of tin plates and terne plates in the United States in 1904, as amounting to 458,000 gross tons, as compared with an estimated production of 480,000 tons in 1903, a decrease of 22,000 tons, or over 4.5 per cent.

Production of All Rolled Iron and Steel.

By the phrase rolled iron and steel are included all iron and steel rolled into finished forms. Forged armor plate, hammered axles and other forgings are not included, nor such intermediate rolled forms as muck bars, billets, tin plate and sheet bars, &c.

The production of all kinds of iron and steel in finished forms in the United States in 1904 amounted to 12,013,381 gross tons, against 13,207,697 tons in 1903, a decrease of 1,194,316 tons, or over 9 per cent. Of the total production in 1904 about 10,253,297 tons were rolled from steel and about 1,760,084 tons from iron. Twenty-seven States rolled either iron or steel or both iron and steel in 1904, against 25 States in 1903.

Pennsylvania made over 53.7 per cent. of the total production of rolled iron and steel in 1904, against over 54 per cent. in 1903; Ohio over 12.6 per cent. in 1904, against over 14 per cent. in 1903; Illinois over 10.3 per cent. in 1904, against over 11 per cent. in 1903; New York over 4 per cent. in 1904, against over 1.9 per cent. in 1903, and Indiana over 3.4 per cent. in 1904, against over 3 per cent. in 1903.

Comparative Production of Iron and Steel.

In 1890 the production of finished rolled steel amounted to 3,504,681 gross tons, as compared with 2,518,194 tons of finished rolled iron; in 1889 to 2,927,656 tons of steel, as compared with 2,309,272 tons of iron; and in 1888 to 2,464,086 tons of steel, as compared with 2,153,263 tons of iron. Prior to 1888 complete statistics of the production of rolled steel were not collected by the association. From 1890 to 1904 the increase in the production of finished rolled steel amounted to 6,748,616 tons, or over 192 per cent., while the decrease in the production of finished rolled iron amounted to 758,110 tons, or over 30 per cent.

In the following table the approximate production of leading articles of finished rolled steel in 1904 is given, as compared with the approximate production in the same year of like articles of finished rolled iron. All miscellaneous products are included.

Products.—Gross tons.	Steel.	Iron.	Total.
Rails	2,283,840	871	2,284,711
Structural shapes	941,127	8,019	949,146
Plates and shears	2,353,685	67,713	2,421,398
Nail plate	42,182	19,419	61,601
Wire rods	1,697,862	1,166	1,699,028
Merchant bars, skelp, spike rods, splice bars and other finished rolled products	2,934,601	1,662,896	4,597,497
Totals	10,253,297	1,760,084	12,013,381

In 1902, 1903 and 1904 there were no forges in operation in the United States for the manufacture of blooms

and billets from the ore. In 1901 the blooms and billets so made amounted to 2310 gross tons, against 4292 tons in 1900 and 3142 tons in 1899. All the ore blooms produced since 1897 were made by the Chateaugay Ore & Iron Company of Plattsburgh, N. Y., at its Standish Works, which were, however, idle in 1902, 1903 and 1904. All the Catalan forges in the South have been virtually abandoned; none are now active.

The iron blooms produced in forges from pig iron and scrap in 1904, and which were for sale and not for the consumption of the makers, amounted to 5743 tons, against 9940 tons in 1903, 12,002 tons in 1902, 8237 tons in 1901, 8655 tons in 1900, 9932 tons in 1899, 6435 tons in 1898, 7159 tons in 1897, and 6494 tons in 1896, all made in New York, Pennsylvania and Maryland.

Production of Allegheny County, Pennsylvania.

The following table gives the number of blast furnaces and completed rolling mills and steel works and the production of pig iron and crude steel, rails, structural shapes, plates and sheets, miscellaneous rolled products and all finished rolled iron and steel in Allegheny County, Pennsylvania, from 1902 to 1904:

Details.—Gross tons.	1902.	1903.	1904.
Furnaces built and building, No.	40	41	42
Production of pig iron	4,260,769	4,211,569	4,383,169
Rolling mills and steel works, No.	66	65	64
Production of Bessemer steel	3,094,175	2,748,833	2,487,412
Production of open hearth steel	2,503,245	2,604,349	2,737,560
Production of all other steel	62,888	51,195	36,408
Total production of steel	5,660,308	5,404,377	5,261,380
Production of all kinds of rails	712,286	749,953	586,210
Production of structural shapes	773,144	689,849	601,025
Production of plates and sheets	1,010,650	945,327	839,015
Production of other rolled products	1,977,179	1,797,795	1,707,545
Production of all rolled products	4,473,259	4,182,924	3,733,795

Iron and Industrial Stocks.

NEW YORK, June 21, 1905.

The general course of the stock market during the past week has been upward. The volume of transactions, however, has been light, as the influences predominating at this season are not conducive to very active speculation. The United States stocks and Tennessee Coal & Iron have been conspicuous in the upward movement. United States Steel preferred advanced from 93 1/2 on Thursday to 96 1/2 on Tuesday, while the common in the same time advanced from 27 1/2 to 28 1/2. Tennessee Coal moved up from 77 to 79 1/2 in the same period. Steel Foundries preferred was under pressure, probably because of the report of a bond issue, and declined from 38 1/2 on Thursday to 36 1/2 on Saturday, recovering, however, to 39 1/2 on Tuesday. Nearly all iron and steel stocks advanced sharply this morning. Last transactions on active stocks up to 1:30 p.m. to-day were made at the following prices: Can common 11 1/2, preferred 69; Car & Foundry common 34 1/4, preferred 98; Locomotive common 48 1/2, preferred 113 1/2; Colorado Fuel 43 1/2; Pressed Steel common 38 1/2, preferred 92 1/2; Railway Spring common 32, preferred 96 1/2; Republic common 18 1/4, preferred 75 1/2; Sloss-Sheffield common 79 1/2, preferred 107; Steel Foundries common 10, preferred 41; Tennessee Coal 81 1/2; United States Steel common 29 1/2, preferred 98, new 5's 94 1/2.

The Cambria Steel Company has paid \$45,000 more of its 5 per cent. notes. This leaves \$565,000 of these obligations outstanding, all of which will probably be retired next year. The original amount of these notes was \$3,500,000. They were created December 15, 1900. Last year the company retired \$665,000.

Dividends.—At a recent meeting of directors of the Bostwick Steel Lath Company, Niles, Ohio, the usual annual dividend was declared. It is stated that the past year was the most successful in the history of the concern, which has been organized 14 years and paid a dividend each year it has been operating.

Tennessee Coal, Iron & Railroad Company has declared a quarterly dividend of 1 per cent. on the common stock, payable August 1. This confirms the 4 per cent. rate for the stock, 1 per cent. having been paid in May, when dividends were resumed after a suspension of several years.

Empire Steel & Iron Company has declared a dividend of 1 1/2 per cent. on the preferred stock from the earnings of the last six months, payable July 1.

American Smelting & Refining Company has declared the regular quarterly dividend of 1 1/4 per cent. on the preferred stock, payable July 1, and 1 1/4 per cent. on the common stock, payable July 15.

Westinghouse Electric & Mfg. Company has declared the regular quarterly dividend of 2 1/2 per cent., payable July 10.

American Screw Company has declared a quarterly dividend of 1 1/2 per cent., payable June 30.

Production by United States Steel Corporation.

A feature of the American Iron and Steel Association's report is a statement of the production of various forms of iron and steel by United States Steel Corporation subsidiary companies in the calendar year 1904, compared with the total for the country in the respective

at different yards, while the hulls have frequently been constructed from the same drawings, the designs of the machinery have been left to the respective engineers. But engines, as well as hulls, can be made much alike in many vessels, and as many castings as may be necessary may be taken off each pattern and the machinery in each vessel built up from "parts." This is a plan to be ultimately developed. There will always be a num-

Production of Iron and Steel by the United States Steel Corporation in 1904, and Comparison with Total for the United States.

	By United States Steel Corporation.	By independent companies.	Total shipments and production.	Percentage.		
				United States Steel Corporation.	1904.	1903.
Iron ore shipments from Lake Superior and the total iron ore production in the calendar year 1904; also coke production in the same year:						
Shipments of iron ore from the Lake Superior region in 1904, gross tons.....	11,746,409	10,076,430	21,822,839	53.8	58.8	60.4
Total production of iron ore in 1904, gross tons.....	10,503,087	17,096,913	*27,600,000	38.0	43.8	45.1
Production of coke in 1904, net tons.....	8,652,293	14,969,227	23,621,520	36.6	34.2	37.4

	Production United States Steel Corporation.	Production independent companies.	Total production.	Percentage.		
				United States Steel Corporation.	1904.	1903.
Iron and steel actually produced in the calendar year 1904. Gross tons.						
Bessemer, basic, low phosphorus, foundry, forge and all other kinds of pig iron.....	7,213,933	9,062,708	16,276,641	44.3	39.9	44.3
Spiegeleisen, ferromanganese and ferrophosphorus.....	155,488	64,904	220,392	70.5	81.0	81.0
Total pig iron, including spiegeleisen, ferromanganese and ferrophosphorus	7,369,421	9,127,612	16,497,033	44.6	40.4	44.7
Bessemer steel Ingots and castings.....	5,427,979	2,431,161	7,850,140	69.0	72.0	73.9
Open hearth steel Ingots and castings.....	2,978,399	2,929,767	5,908,166	50.4	51.0	52.4
Total Bessemer and open hearth steel Ingots and castings..	8,406,378	5,360,928	13,767,306	61.0	63.5	65.7
Bessemer steel rails.....	1,223,884	914,073	2,137,957	57.2	65.6	65.4
Structural shapes.....	523,854	425,292	940,146	55.1	60.3	57.9
Plates and sheets, including black plates for tinning, but excluding nail plate.....	1,406,397	1,015,001	2,421,398	58.0	59.9	59.4
Wire rods.....	1,212,012	487,016	1,699,028	71.3	73.1	71.5
Bars, skelp, nail plate, open hearth and iron rails, and other finished rolled products.....	1,378,651	3,427,201	4,805,852	28.6	29.8	31.1
Total of all finished rolled products.....	5,744,798	6,268,583	12,013,381	47.8	51.2	50.8
Wire nails, kegs of 100 pounds.....	7,998,912	3,927,749	11,926,661	67.0	70.6	64.8

* The total production by the whole country is subject to revision, but the figures for the United States Steel Corporation are final.

lines. We have added also the percentages of Steel Corporation production in the years 1903 and 1902, which show that in most lines the Steel Corporation's proportion of the total output was less than in either 1903 or 1902.

Standardization in British Shipbuilding.

GLASGOW, June 10, 1905.—The strike of pattern makers on the Clyde has evolved a system of mutual aid among the employers which has large possibilities. It is of course the custom among both shipbuilding and engineering employers to endeavor whenever possible to make one set of patterns suffice for more than one vessel or one set of engines. This plan has hitherto been confined to individual establishments, but it is capable of indefinite expansion. Since the strike of the pattern makers employers have been freely borrowing and lending patterns. Of course a pattern received from another firm may not always suit one exactly, but it may be so nearly what is required as, with little alteration, to serve the purpose. This idea of uniformity and standardization is spreading extensively among our shipowners and shipbuilders. Orders are frequently placed for steamers to be built from the same drawings, not at one yard but at separate yards. In some cases builders would not think of making two sets of patterns. For instance, two vessels are being built on the Clyde by different builders, for which the same drawings and patterns are being used.

The strike on the Clyde has done a great deal to further mutual assistance of this kind among the federated employers. The object of standardization is to cheapen production by making the corresponding parts of machinery, as well as screws, bolts, &c., all of the same size and shape, so that parts can be made by the thousand, and machine after machine can be built up with the minimum of fitting. Hitherto in steamers built

ber of new patterns required for new types of vessels and machinery, and standardization can only apply to liners and cargo steamers doing work of a similar character, and to fishing vessels. These, however, constitute a large proportion of the ships built each year. The system receiving its impetus from the present strike will continue to develop afterward.

B. T.

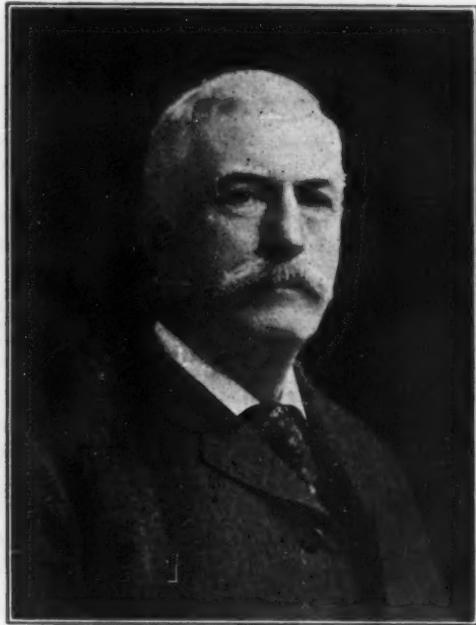
The Phillips Sheet & Tin Plate Company.—This company, which recently bought the sheet and tin plate plant of the Jackson Iron & Tin Plate Company, at Clarksburg, W. Va., has started up two sheet mills in the plant and expects to start three more mills this week and to have the entire eight mills in operation before July 1. The plant contains eight hot mills, the output being long sheets and black plate for tinning, and the annual capacity is about 20,000 tons. As yet no one has been elected to fill the position of J. R. Phillips, president, who lost his life in the Pennsylvania Railroad wreck at Harrisburg on May 11. John Williams, formerly of the Monessen plant of the American Sheet & Tin Plate Company, has been appointed superintendent of the entire plant. The other officials are: W. H. Baldridge, vice-president; E. T. Weir, secretary and manager, and Paul D. Bogle, treasurer. The company has opened an Eastern office in Room 1018, Whitehall Building, 17 Battery place, New York City.

The Kingsley Water Tube Boiler Company has been organized, with a New Jersey charter, to manufacture boilers, boiler fittings and machinery. The company has a capital stock of \$100,000, and Wallace Downey, who has offices at 21 State street, New York, is the principal incorporator. The company is already doing business and at present its output is made at Titusville, Pa. Later on the company will have a plant erected near New York, but no arrangement has been made to that end as yet.

OBITUARY.

GEORGE A. GRAY.

George A. Gray, former president of the G. A. Gray Company, builder of machine tools, died June 14, from heart trouble, at his home in Cincinnati, aged 66 years. He was born in 1839 in a small town in Illinois and his boyhood was spent on a farm. He went to Cincinnati when a young man for the purpose of taking a thorough course in mechanics. His apprenticeship was served with Miles Greenwood. He then entered the service of the Niles Tool Works, at that time located in Cincinnati. He afterward went to Hamilton, Ohio, where the firm of Gray, Gordon & Gaff was established, former owners of the Niles Tool Works of that city. In the year 1881 he returned to Cincinnati, where the firm of G. A. Gray, Jr., & Co. was established, Robert Brown, then treasurer of the Cincinnati Gas Company, being his associate. In 1886 he formed a stock company under the name of the G. A. Gray Company, whose president he remained until compelled to retire on account of ill health some four months since. Mr. Gray was a mechanic of unquestioned



GEORGE A. GRAY.

ability, and the planer which he designed and which bears his name is known throughout the world. During the War of the Rebellion he received a call from the Government to go to the Washington Navy Yard to superintend the repairs to ships of war. He was also general constructing engineer and designer for the Miles Greenwood people, they having contracts with the Government to build a number of gun boats. He joined the American Society of Mechanical Engineers in 1884, holding his membership up to the date of his death. He was a director in the Third National Bank and was the head of the Building Committee for the new St. Paul Cathedral house. He is survived by a son and a daughter.

NOTES.

GUSTAV STIEGLITZ, secretary and treasurer of the American Metal Ware Company, Chicago, died June 4, aged 56 years. He was born in Germany, coming to the United States in 1866. He became interested in the metal ware business in 1893. A widow and seven children survive him.

CARL LUEG, one of the great captains of industry of Germany, died May 5. Born at Sterkrade in 1833, he graduated at the technical college at Kalsruhe, and in 1864 succeeded his father as the technical director of the iron works at Oberhausen. When in 1872 the works were organized as the Gutehoffnungshütte, he assumed the management and was actively identified with its rapid

growth until 1903. He was president of the German Society of Iron Masters when it was organized, in 1879.

AMOS SHEPARD, one of the prominent figures among Lake Superior mining men, died recently at Whitewater, Wis., where he had gone from Duluth, to recover from an accident which took place some weeks ago. This accident caused a fracture of the skull, but he was thought to be on the road to recovery when complications set in that quickly resulted in death. Mr. Shepard was 44 years old, and a native of Wisconsin. In the early days of the Menominee range he went there to work, and did whatever his hands found to do, did it well, and thoroughly learned the mining business, in the mine and at the office. When the Vermilion range was to be opened, in 1883, Mr. Shepard went there as chief accountant for the Minnesota Iron Company, and with the exception of a short time spent in Crystal Falls as superintendent for Corrigan, McKinney & Co., he has lived in northern Minnesota since then. At the time of his death he was general manager for that firm for its Mesaba and Gogebic range mines, and his record at the Stevenson last year, when he made a production of 1,650,000 tons, showed the kind of work he could do.

EDWARD HARVEY PARKS, one of the important mechanical engineers and designers of the Brown & Sharpe Mfg. Company, Providence, R. I., died in that city June 9 after a long illness. Mr. Parks was born in St. Johnsbury, Vt., in 1837, and when a boy removed with his parents to Worcester, Mass., where he was educated in the public schools. He entered the employ of Brown & Sharpe in 1866 as foreman of the machine shops and held that position for about 13 years, until in 1879 he was made mechanical engineer. Some time after this he started in business for himself at Worcester, but returned to Brown & Sharpe in 1897 as a designer. He was a member of the American Society of Mechanical Engineers and of the Providence Engineering Society. He leaves a widow and one son.

HARRY B. BLACK, owner of the Chester Edge Tool Works, Chester, Pa., died suddenly May 29 from apoplexy. He was born May 9, 1837, in Upper Darby township, Delaware County. In 1875 he purchased the Chester Edge Tool Works of John C. Beatty, and continued to manufacture the Beatty axe. He is survived by a widow, a son and three daughters.

JARED DENNIS, identified with the machinery trade for many years, died at Hartford, Conn., June 9. He was born in Norwich, Conn., in 1831, and before the war was engaged with two brothers as manufacturers of machinery. After service in the navy during the Civil War he became superintendent of the Hartford Machine Company, and it was under his direction that the St. Louis pumping engine was erected, the greatest of its type at that time, having a capacity of 34,000,000 gallons a day. Mr. Dennis leaves a widow, a son and a daughter.

RALPH H. PLUMB, president of the Buffalo Bolt Company, Tonawanda, N. Y., died June 10 at his home in Buffalo. He was born in Gowanda, N. Y., September 20, 1845, and had resided in Buffalo for many years. He was president of the Buffalo Fine Arts Academy and was one of its most earnest supporters. He leaves one son.

CHARLES BINISCH, a widely known dealer in iron, metals and second hand machinery, died at his home in Newark, N. J., June 9, aged 58 years. He was born in Carlsbad, Germany, and at the age of 17 came to this country, locating in Newark. He gradually built up a business which extended all over this country and had direct connections in England and Germany. He is survived by a widow and six children.

LOUIS LELONG of the firm of L. Lelong & Brother, metal refiners, Newark, N. J., died June 14, aged 67 years. He was born in New York City. He is survived by a widow.

RICHARD S. SAYER, treasurer of the Rider-Ericsson Engine Company, New York, was killed June 14 while crossing the Erie Railroad tracks near Goshen, N. Y., in an automobile. He was accompanied by his wife and two sons. His wife was also killed and the sons were seriously injured.

NEWS OF THE WORKS.

Iron and Steel.

The Tennessee Iron & Land Company, Dickson, Tenn., which was recently incorporated with a capital stock of \$1,500,000, divided into \$900,000 common and \$600,000 preferred stock, will develop iron and phosphate properties in Hickman County and make pig iron. The company will open up about 2200 acres of land to supply a 100-ton blast furnace which it purposed to erect as soon as possible. An ore washer will be installed and 6 miles of railroad will be constructed. The officers are J. O. Griffith, president and general manager; S. E. Hunt, vice-president, and S. M. Grandey, secretary and treasurer.

At the annual meeting of the Western Tube Company, Kewanee, Ill., A. M. Hewlett was elected president; John Duncan, vice-president and general manager, and C. E. McCullough, secretary and treasurer. The business for the year was largely in excess of the year preceding, the company's sales being \$80,000 in excess of those for the previous year. About \$130,000 was expended this year on improvements to the plant.

The new plant which the Union Drawn Steel Company, Beaver Falls, Pa., is to install at Hamilton, Ont., will be 108 x 225 feet. The machinery will all be practically of the company's own design and make, so that there will be little or nothing in the way of machine tool purchases. It has not yet been decided what kind of power will be used, but the probabilities are that the plant will be operated by electricity.

White, Dixon & Co., Mont., Ky., have leased the iron property and furnace plant known as Centre Furnace, in Trigg County, and will rebuild the furnaces with the expectation of blowing in about October 1 on cold blast charcoal iron. Considerable repairs will have to be made to the stack, and the company will require two 36-inch by 46-foot cylinder or shell pattern boilers and one 64-inch by 46-foot boiler, second-hand preferred if in good condition. This furnace was blown out in 1885 and at that time had a record of 12 tons of cold blast pig iron daily, but it is understood that in the last year or two she was in operation she made warm blast charcoal iron.

President Niven McConnell of the Passaic Steel Company, Paterson, N. J., has plans under way for a complete change of the policy and operation of the works. To provide the necessary funds for carrying out his ideas, which include important changes in the arrangement of the mill and the addition of new works, the stockholders recently authorized an issue of \$1,000,000 preferred stock.

No. 3 stack at the Ohio Works of the Carnegie Steel Company, Youngstown, Ohio, has been repaired and is ready for operation, but has not yet been put in blast.

The Jones & Laughlin Steel Company, Pittsburgh, has started up the fourth Taibot furnace in its open hearth plant. A fifth Taibot furnace is under erection and will be ready for operation about September 1. This company has very materially increased its capacity for the manufacture of Bessemer and open hearth steel and is now able to turn out upward of 3500 tons a day.

The Vulcan Crucible Steel Company, Aliquippa, Pa., manufacturer of high grade crucible and acid open hearth steel, is adding a 5-ton annealing furnace to its plant and also a warehouse 80 x 80 feet. These additions have been made necessary by the increased demand for the steels made by this company.

G. W. McClure, Son & Co., engineers and contractors, Bessemer Building, Pittsburgh, and sole builders in the United States of the Massick and Crooks hot blast fire brick stoves, have been awarded a contract for four stoves for the new blast furnace now building by the Carnegie Steel Company at Mingo Junction, Ohio. The stoves will be of the McClure type, 21 x 100 feet. The firm is also adding a fourth McClure hot blast stove, 20 x 80 feet, at the blast furnace of the Kittanning Iron & Steel Mfg. Company, Kittanning, Pa.

A dispatch from Columbus, Ohio, states that W. S. Ravenscroft of Pittsburgh, Lakin C. Taylor of Cambridge and H. B. Stewart of Canton, Ohio, the Executive Committee of the United Sheet & Tinplate Company, have decided to reopen the mills at Marietta and Newcomerstown, Ohio, on July 1 with 600 men and gradually increase the force.

General Machinery.

The George L. Squier Mfg. Company, manufacturer of plantation machinery, Buffalo, N. Y., has in hand a number of export orders: a large sugar plant equipment for Haiti, a five-roll cane mill for Mexico, and a five-roll cane mill for West Africa.

The Georgia Central Railroad is making a number of improvements on its Chattanooga, Tenn., division, among which will be an enlargement of its shops in that city.

Among the foreign orders recently received for execution by the Buffalo Forge Company, Buffalo, N. Y., are the following: Two large steel plate electric fans for the Underground Electric Railways of London, Limited, London, England; blast and exhaust system and down draft forge shop equipment for A. L. Schutte, Cologne, France; blast and exhaust system and down draft forge shop equipment for Schuchardt & Schutte, Vienna, Austria; complete down draft forge shop equipment consisting of 12 Buffalo down draft forges with hoods and connections, No. 9 Buffalo steel pressure blower, 60-inch special exhaust fan for His Majesty's Dock Yards, Bombay, India. In the line of domes-

tic orders the company is now building a fan system, heating and ventilating, for the L'Uverture School, St. Louis, Mo.; three large outfits for heating and ventilating the manual training shops of the Washington University, St. Louis, Mo., and a large forge shop equipment for the American Express Company, New York.

The Buffalo, Rochester & Pittsburgh Railroad Company has recently installed at its Buffalo docks a Hulett ore unloader. The bucket has capacity of about 10 gross tons, and the maximum speed of 60 buckets in 40 minutes has been attained, as the average speed is about one bucket per minute. The bucket leg is mounted on rotating trunnions.

The Anderson Tool Company, Anderson, Ind., has about completed the addition to its plant. This building will be used for the manufacture of iron and steel specialties.

The Warner & Swasey Company, Cleveland, Ohio, has broken ground for a large addition to its works, including new offices. The new section of the main building will be 55 x 240 feet and five stories high above the basement. It will be of fire proof construction and most modern in every particular. A complete new power plant is also to be provided. These additions will practically double the company's present capacity. Contracts were let some time ago, and the work is to be completed in the early fall.

The Hart-Parr Company, manufacturer of oil cooled gasoline engines, Charles City, Iowa, is building an extension to its machine shop 83 x 314 feet and an extension to the foundry 60 x 84 feet. These extensions are being put up in a very substantial manner of concrete, steel and glass, and will be equipped with traveling cranes and used principally for erecting work. All material and machinery which will be placed in these extensions this season have been provided for, most of the machinery being special and constructed within the company's own works.

F. Y. Goldsborough, Eufaula, I. T., is in the market for corn shucking and shelling machinery, also for shuck shredding and baling machinery.

The Potomac Engineering Company, Cumberland, Md., has incorporated to do a general engineering business. It will erect small electric plants, manufacture mine cars and do general foundry and boiler work. The company has purchased the plant and equipment of the Cumberland Foundry & Machine Company and has installed additional machinery. A full line of mill and mine supplies will also be carried. Thomas S. Kean is president; Adam C. Hice, vice-president; Leo T. Lawler, secretary; Michael Murray, treasurer, and Frank E. Brinker, superintendent.

Power Plant Equipment.

The Del Rio Electric Light & Ice Company, just incorporated at Del Rio, Texas, for \$200,000, has purchased a plant fully equipped for operating an electric light and ice plant. John M. Gray is manager of the company.

The Crescent Mfg. Company, Louisville, Ky., has purchased the equipment for its new power plant from the Henry Vogt Machine Company of that city.

I. C. Orswell, Amesbury, Mass., is to establish a shop for the manufacture of a jump spark plug for automobile and motor boat motors, a patent on which has been recently granted him. Mr. Orswell states that he is not at present in the market for new machinery.

The Macomb Electric Light & Gas Company, Macomb, Ill., has purchased one 100 horse-power Bates Corliss engine and one 100 and one 150 kw. three-phase generator. The generators were bought from the General Electric Company.

The Boston & Northern Street Railway Company, which operates electric lines in eastern Massachusetts, will issue \$500,000 of 50-year bonds to pay for improvements to the system, some of which have been finished and others still to be undertaken.

The Water Committee of the City Council, Winona, Minn., has authorized the purchase of a 4,000,000-gallon pump and new boiler for the water station.

O. V. Hooker & Son, St. Johnsbury, Vt., founders and machinists, have bought one-half interest in the water power on the Passumpsic River, at the electric light station, Lyndon, Vt., and state that the power will be developed for electrical purposes. There is a fall of 68 feet. The purchase includes land upon which the power station will be erected.

The town of Clinton, Minn., F. W. Watkins, Recorder, will purchase a 12 horse-power gasoline engine and about 5000 feet of water mains.

Parsell & Weed, 129-131 West Thirty-first street, New York, who have been carrying on business at that location for the last five years, have incorporated under the same name. The company manufactures electric and mechanical specialties, such as dynamos, motors, instruments, gas engines, &c. It is possible that the plant will be enlarged in the fall.

During the years 1903 and 1904 Takata & Co., agents for the Westinghouse Machine Company in Japan, have sold no less than 50 Westinghouse engines, ranging from 600 horse-power down to 12½ horse-power and aggregating in capacity about 8000 horse-power. They are all of the vertical single-acting type, both simple and compound. The list of customers comprises Government arsenals, railroads, electric light companies,

bureaus, water works, mines, universities and hospitals. Among the more important orders filled are: Akabane Arsenal, 1950 horse-power; Kure and Tokio arsenals, 1628 horse-power; Klushiu and Nippon railways, 579 horse-power; Yokoska Arsenal, 547 horse-power; Fukagawa and Tokio Electric Light companies, 450 horse-power; Mr. Furukawa's Western Bureau, 1265 horse-power; Tokio Imperial University, 93 horse-power; Yokohama Electric Wire Works, 62 horse-power; Tokio Water Works, 31 horse-power.

Foundries.

The Newport Foundry Company, Newport, R. I., has been incorporated under Rhode Island laws to take over a foundry business that has been conducted for years as a copartnership. The capital stock is \$15,000. The incorporators are Robert Frame, Edward L. Spencer and Eliza M. Peckham.

The Easthampton Foundry, Easthampton, Mass., of which Ernest Moekel and Alwyn Hartling are the proprietors, will erect a one-story foundry building, 60 x 80 feet. It is not proposed to install new equipment in the immediate future.

A meeting of the stockholders of the Sharon Foundry Company, Sharon, Pa., will be held June 26 for the purpose of increasing the capital of the concern \$100,000, the money to be used in building an open hearth steel plant for the manufacture of steel castings.

The West Allis Malleable Iron & Chain Belt Works, West Allis, Wis., is breaking ground for a large addition to its present plant. The foundry addition will be 70½ x 222 feet and the addition to the manufacturing department will be 64 x 70½ feet, two stories in height. In the new foundry will be installed two annealing ovens, seven pairs of W. W. Sly Mfg. Company's barrel system, a Sly cinder mill, a dust arrester system made by the same firm and a 14-ton reverberatory furnace. The arrester system will include a National Electric motor, fans, piping, &c. Edwin Reynolds, chief consulting engineer for the Allis-Chalmers Works, is president of the company.

The Tobin-Gerlinger Steel Castings Company, West Allis, Wis., is finding its present plant inadequate and is contemplating either rebuilding at West Allis or removing to some other center.

Fires.

The Mansfield Sucker Rod Works, at Mansfield, Ohio, were recently destroyed by fire. The loss is placed at \$5000.

The plant of the Evansville Plating Company, Evansville, Ind., was recently destroyed by fire. The loss amounts to \$10,000.

The sub-station of the Evansville & Princeton Traction Company at Margaret, near Evansville, Ind., was recently destroyed by fire. The loss is placed at \$10,000.

The factory of the Wisconsin Veneer Company, at Rhinelander, Wis., was struck by lightning and burned to the ground on June 17, resulting in a loss of about \$200,000.

The large flour mill and grain elevators of the John R. Smith Milling Company, at Purellville, Loudoun County, Va., were burned last week. The loss is placed at \$150,000.

The recent fire at the Kokomo Foundry & Machine Works, Kokomo, Ind., was confined to the roof and did but a few hundred dollars damage. It in no way interfered with operations.

Bridges and Buildings.

The Maine Central Railroad has obtained the permission of the War Department to build a new bridge across the Kenduskeag stream at Bangor, Maine. It will be a double track through plate girder bridge with two fixed spans of 81 feet each and a pivot draw span about 150 feet long. The contracts for the steel have not yet been let.

Hardware.

H. E. Wambold, proprietor of the Appleton Wire Screen Company, Appleton, Wis., has equipped a general jobbing foundry for bronze and brass castings, car bearings, locomotive engine trimmings and the like at 247 Fourth street, Milwaukee.

The Peck, Stow & Wilcox Company, Southington, Conn., states that it is to replace the buildings of its East Berlin plant, recently destroyed by fire. The blacksmith, blower, grinding, pickling and divider departments were burned. The company is not at present in the market for machinery for the new plant.

The C. S. Smith Mfg. Company, Milwaukee, Wis., has sold its business and plant on West Thirtieth street to the Davis Mfg. Company, which will continue the manufacture of the Peerless door hangers, tracks and other hardware specialties formerly made by the Smith company. The new company consists of Frank M. Davis, president and manager; F. L. Bryant, vice-president; A. F. John, secretary and treasurer.

The G. B. Lesh Mfg. Company, manufacturer of plow handles and wagon material, Warsaw, Ind., has purchased land at Memphis, Tenn., and will remove its factory to that point. The equipment of the old factory will satisfy present needs, but it is expected later to make extensive enlargements and greatly increase facilities.

The Madison Veneer & Novelty Company, Madison, Ind., has erected a plant for the manufacture of veneers, berry packages, veneer heading for barrels, &c. The building is 70 x 70 feet,

one half being two stories and the other half one story. Equipment for operating the plant at 100 horse-power has been installed.

The National Wire Cloth Company, Niles, Mich., is installing machinery that will triple the capacity of its plant.

The Wire Goods Company, Worcester, Mass., manufacturer of wire specialties, is planning to erect a new building, 50 x 100 feet and four stories, to be used as a storehouse, packing and shipping room. The building will be of heavy mill construction. When it is completed the room now devoted to these departments will be given over to manufacturing.

American Mfg. Company, Chattanooga, Tenn., manufacturer of hardware specialties, not having sufficient room in its present quarters, is building a new brick factory of its own. The new plant will be 96 x 114 feet in dimensions.

The Conneaut Shovel Company, Conneaut, Ohio, has been incorporated with a capital of \$25,000 and will build a plant at that place for the manufacture of shovels, dock supplies and perhaps other lines. The concern may be addressed care of Mott G. Spaulding, Dorman Block, Conneaut, Ohio.

Kelly Foundry & Machine Company, Goshen, Ind., has recently begun the manufacture of Tallerday's galvanized steel culvert pipe, which has been made at its Waterloo, Iowa, factory for the past six years. The large demand for it and the general satisfaction given by it led the company to make it for Eastern trade. It is said to be more durable and more quickly laid than clay pipe, while not subject to damage in shipping and not affected by frost. The company has also added a number of different sizes and styles to its line of steel tanks.

Miscellaneous.

The chemical works connected with the Shenango plant of the American Tin Plate Company, at New Castle, Pa., are being enlarged. The demand for the by-products for paint manufacture is very large, and the chemical works are quite busy.

The Universal Voting Machine Company has been organized at Indianapolis, Ind., and incorporated with \$50,000 capital stock by Arthur Jordan, Edwin B. Cummings, Arthur R. Baxter, V. H. Lockwood and O. B. Iles.

The Edwards Electric Headlight Company has been incorporated at La Porte, Ind., with \$250,000 capital stock, by Charles A. Goodyear, John H. Kedzie, Jr., William W. Alis, M. K. Northam and John H. Miller.

The Advance Stove Works, Evansville, Ind., has been incorporated with \$100,000 capital stock by Marcus S. Sonntag, William Boettlicher, Christ Kanzler, John R. Koch and George Dauble.

John Tudor, Stamford, Vt., is to build an addition to his factory to be devoted to the manufacture of bobbins. No new machinery is needed at present, but may be later on.

At the annual meeting of the directors of the Westinghouse Air Brake Company, held at the general offices in Wilmerding, Pa., on Friday, June 9, A. I. Humphrey was elected general manager to succeed E. M. Herr, resigned. John F. Miller, who was secretary, was elected fourth vice-president; R. F. Emery, secretary and assistant treasurer; E. A. Craig, auditor and assistant secretary. Mr. Herr was recently elected first vice-president of the Westinghouse Electric & Mfg. Company, but retains a position on the Board of Directors of the Westinghouse Air Brake Company. Mr. Humphrey has been Western manager of the company, with headquarters in Chicago, for the past two years. Previous to that he was superintendent of motive power on the Chicago & Alton and the Colorado Southern railroads.

The New Britain Gas Light Company, New Britain, Conn., is to erect two large buildings for the extension of its plant.

The Wayne Wheel Company, Red Creek, N. Y., has decided to move its plant and business to Newark, N. Y., where it will have excellent shipping facilities.

The Askin-Eskine Milling Company, Evansville, Ind., whose plant was recently destroyed by fire, announces that it will rebuild.

The Roe-Stevenson Mfg. Company, Detroit, Mich., has purchased from C. W. Thomas the plant, equipment and business of the Michigan Brass & Iron Works, also located at Detroit. No change will be made in the management, as C. W. Thomas remains as president of the Roe-Stevenson Mfg. Company. The Roe-Stevenson plant, at McKinley avenue and Grand Trunk Railroad, will be devoted to the manufacture of Scott pop safety valves, Goldsmith throttle valves, Scott gate valves, angle globe and check valves and steam specialties. At the Michigan brass plant the company will continue to manufacture a full line of fire hydrants and the well known Michigan water gates in all sizes from 2 to 120 inches, also valve boxes, indicator posts, foot valves, air and relief valves, plain and indicator floor stands, &c.

E. B. Leaf & Co., Philadelphia, Pa., who recently purchased the plant of the Georgia Car Mfg. Company, Savannah, Ga., and others have organized the Seaboard Car Company, with a capital stock of \$100,000, to operate the works. Though plans have not yet been fully formulated it is understood that the capacity of the plant is to be enlarged. Headquarters are to be located in Savannah.

The William Cramp & Son Ship & Engine Building Company, Philadelphia, Pa., has filed plans for a new brass foundry, 54 x 134 feet, and a new shop 50 x 143 feet, to be erected at its plant at Moyer, Adams & Thompson streets.

The Iron and Metal Trades

New business has been rather light in nearly all branches of the Iron and Steel trades, and in some of them what is virtually a deadlock between buyers and sellers continues. Yet there is little uneasiness in any quarter. On the contrary, sentiment is rather improved, although there is little that is tangible in the way of new orders to justify it.

In Pig Iron there come reports from some distributing markets that inquiries are a little more numerous, but the tonnage being placed is light and buyers are securing some concessions in prices. Birmingham reports sales of Basic Pig for Western delivery aggregating 15,000 tons, but the market is easier, and \$12 is being shaded for No. 2 Foundry.

The Coal miners of the Birmingham district have decided to demand again last year's scale, which the commercial mines accepted and the furnace companies with only two exceptions refused, making the fight which has now lasted nearly a year. The situation is, therefore, unchanged, and the open mines of the furnace companies will continue as heretofore.

Practically nothing has been done in Bessemer Pig in the Central West. The low prices for Melting Scrap have rather curtailed the requirements for Pig in the Open Hearth Steel plants.

The only interesting item in the Rail trade is the report that the Tennessee Company has taken orders aggregating 55,000 tons for 1906 delivery from Southern systems. The Ohio Steel plant at Youngstown is about to roll Rails in the place of Sheet and Tin Plate Bars.

The tonnage of Structural Material which is coming upon the market is very satisfactory, and some trouble in meeting deliveries is being experienced. Among the larger contracts placed is that for 24,000 tons for the Philadelphia Rapid Transit, which has hung fire for some time past.

The Plate trade is in good shape. Among the orders for boats lately placed is one large vessel for the Hudson River Line and a turbine vessel for the New York-Boston Line. The hull and machinery for the former will be built on the Hudson, while the hull for the latter has not yet been placed. The contractors for both are the Fletchers of Hoboken, N. J.

A meeting is being held to-day between the Amalgamated Association and the independent Sheet mills. The demands of the men for an advance of about 18 per cent. will certainly not be granted, and there is a chance for a partial suspension of work.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

June 21, June 14, May 24, June 22,
PIG IRON: 1905. 1905. 1905. 1904.

Foundry Pig No. 2, Standard, Philadelphia	\$16.50	\$16.75	\$17.25	\$14.50
Foundry Pig No. 2, Southern, Cincinnati	14.50	14.75	15.75	11.75
Foundry Pig No. 2, Local, Chicago	16.25	16.50	17.25	13.25
Bessemer Pig, Pittsburgh	15.35	15.85	16.10	12.50
Gray Forge, Pittsburgh	14.85	15.35	15.50	12.15
Lake Superior Charcoal, Chicago	16.50	17.00	17.50	14.50

BILLETS, RAILS, &c.

Steel Billets, Pittsburgh	21.00	22.00	23.00	23.00
Steel Forging Billets, Pittsburgh	25.00	25.00	26.00	...
Steel Billets, Philadelphia	26.00	26.50	27.00	24.00
Steel Billets, Chicago	28.00	28.00	28.00	23.00
Wire Rods, Pittsburgh	33.00	33.00	34.00	29.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL:

O. Steel Rails, Chicago	12.00	12.00	13.00	9.50
O. Steel Rails, Philadelphia	15.00	15.00	16.00	11.25
O. Iron Rails, Chicago	17.00	18.50	18.00	14.50
O. Iron Rails, Philadelphia	18.00	18.50	20.00	14.50
O. Car Wheels, Chicago	14.25	14.25	14.75	10.50
O. Car Wheels, Philadelphia	14.50	15.00	16.00	11.00
Heavy Steel Scrap, Pittsburgh	13.50	13.75	14.50	11.00
Heavy Steel Scrap, Chicago	11.75	11.75	12.00	9.00

FINISHED IRON AND STEEL:

Refined Iron Bars, Philadelphia	1.63½	1.63½	1.63½	1.48½
Common Iron Bars, Chicago	1.50	1.50	1.55	1.27½
Common Iron Bars, Pittsburgh	1.55	1.60	1.50	1.30
Steel Bars, Tidewater	1.64½	1.64½	1.64½	1.49½
Steel Bars, Pittsburgh	1.40	1.50	1.50	1.35
Tank Plates, Tidewater	1.74½	1.74½	1.74½	1.74½
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater	1.74½	1.74½	1.74½	1.74½
Beams, Pittsburgh	1.60	1.60	1.60	1.60
Angles, Tidewater	1.74½	1.74½	1.74½	1.74½
Angles, Pittsburgh	1.60	1.60	1.60	1.60
Skelp, Grooved Steel, Pittsburgh	1.50	1.50	1.50	1.35
Skelp, Sheared Steel, Pittsburgh	1.55	1.55	1.55	1.35
Sheets, No. 27, Pittsburgh	2.20	2.20	2.20	2.05
Barb Wire, f.o.b. Pittsburgh	2.25	2.25	2.25	2.50
Wire Nails, f.o.b. Pittsburgh	1.80	1.80	1.80	1.90
Cut Nails, Mill	1.80	1.80	1.80	1.75

METALS:

Copper, New York	15.00	15.00	15.00	12.62½
Spelter, St. Louis	5.07½	5.10	5.30	4.60
Lead, New York	4.50	4.50	4.50	4.20
Lead, St. Louis	4.42½	4.42½	4.40	4.10
Tin, New York	30.55	30.25	30.25	25.50
Antimony, Hallett, New York	11.50	11.50	8.87½	7.25
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	3.74	3.74	3.74	3.64

Chicago.

FISHER BUILDING, June 21, 1905.

There is still quite generally a deadlock between buyers and sellers as far as large tonnages are concerned, buying being limited to current necessities. Specifications on old contracts for finished Iron and Steel are quite liberal, and in some cases are extremely heavy, owing to the desire on the part of holders of low priced contracts to realize the paper profit by ordering the surplus tonnages into stock. Pig Iron is a little weaker as far as the actual prices quoted, but has lost nothing of the strong undertone which prompts the furnaces to sell as little as possible of their product at present figures in order that they may hold for the higher prices which they confidently expect. The order for over 2000 tons of Iron for the Pullman Company was placed last week at a price considerably below the prevailing market. A very large percentage of Iron for second half is yet unbought, and stocks in melters' yards are running low. This leads sellers to conclude that a general buying movement cannot be much longer delayed, and that when it does set in it will be a vigorous one.

Pig Iron.—Prices continue to recede under the persistent onslaughts made by large buyers, assisted by a lack of cohesion among Southern producers. At least the Southern producers are held responsible by Northern furnaces for the present low prices, though the Southern interests are not slow to charge the Northern producers with having been the first to break prices. The order for about 2000 tons of mostly Northern Iron for the Pullman Company was placed in Chicago last Saturday. If current reports are true this purchase was made at a great reduction below present market. Meanwhile Northern furnaces are quoted quite generally on the basis of \$16, at furnace, or \$16.25 to \$16.50, Chicago; one large local interest holds firmly for the higher figures. A local Milwaukee furnace is making a price of

\$16, delivered, Milwaukee, and a new furnace at Duluth is competing in that field with Charcoal Iron at something under \$15, at the furnace, and about \$16, St. Paul or Minneapolis. In Southern Irons, where \$12 was quoted generally the bottom of the market last week, it is the top of the market this week, with trading claimed to be going on at \$11.75 and possibly lower. In spite of these low prices there is no feeling of panic among Iron producers, and most of them are restricting their sales to the smallest possible tonnages at present figures in the belief that prices will rally very shortly and rule higher during the second half of the year than they did during the first. It is estimated that 85 per cent. of the Pig Iron required for the second half of the year is as yet unbought and the impression is general that melters have been allowing their stocks to run down to a point where they will be forced to come into the market before long. It is thought that when the general buying movement does set in it will be of such vigorous character that furnaces will have things very much their own way. Outside of the Pullman order and about 1000 tons to a Minnesota melter no large blocks of Iron have been sold, but inquiry is improving and melters generally are feeling the market. The prices given below will be quoted by most producers for June, July and August delivery, some refusing to quote beyond the end of July, while others will include September along with July and August. Prices for the whole of the second half rule slightly higher and for the fourth quarter alone a decided premium is asked. We quote the following prices:

Lake Superior Charcoal.....	\$16.50 to \$17.00
Northern Coke Foundry, No. 1.....	16.75 to 17.00
Northern Coke Foundry, No. 2.....	16.25 to 16.50
Northern Coke Foundry, No. 3.....	15.75 to 16.00
Northern Scotch, No. 1.....	17.00 to 17.50
Ohio Strong Softeners, No. 1.....	17.30
Ohio Strong Softeners, No. 2.....	16.80
Southern Silvery, 4 to 6 per cent. Silicon.....	17.15 to 18.15
Southern Coke, No. 1.....	16.15
Southern Coke, No. 2.....	15.65
Southern Coke, No. 3.....	15.15
Southern Coke, No. 4.....	14.90
Southern Coke, No. 1 Soft.....	15.90 to 16.15
Southern Coke, No. 2 Soft.....	15.40 to 15.65
Southern Gray Forge.....	14.65
Southern Mottled and White.....	14.40
Malleable Bessemer.....	16.25 to 16.50
Standard Bessemer.....	16.80 to 17.05
Jackson Co. and Ky. Silvery, 6 % Silicon.....	19.80 to 20.30
Jackson Co. and Ky. Silvery, 7 % Silicon.....	20.30 to 20.80
Jackson Co. and Ky. Silvery, 8 % Silicon.....	20.80 to 21.30
Jackson Co. and Ky. Silvery, 10 % Silicon.....	21.80 to 22.30
Alabama Basic.....	15.90 to 16.15

Billets.—Car lots and larger of Open Hearth Forging Billets are offered at from \$28 to \$30, while less than car-lots command a considerable premium. As far as has been learned, there has not been sufficient trading in Bessemer Rolling Billets or Sheet Bars to make a market. A sale of 2700 tons of Axle Billets was made recently by a local independent mill at a price which is not divulged, but it is stated to be the same figure obtained a month ago.

Rails and Track Supplies.—As far as can be learned no Standard Section Rail orders of any magnitude have been taken in this market for the leading Rail mills. The statement that the Illinois Central has just purchased 10,000 tons of the leading producer is denied by that interest. Prices are unchanged, as follows: Standard Section Rails, \$28 per gross ton at maker's mill in 500-ton lots or greater, plus full freight to destination; Light Section Rails, \$24 to \$27 per gross ton, according to weight and tonnage; Angle Bars, 1.40c. to 1.50c.; Spikes, 1.75c. to 1.85c., f.o.b. mill, in car lots; Track Bolts, 2.40c. to 2.50c., base, Square Nuts. Store prices on Track Supplies range from 15c. to 25c. per 100 lbs. above car lot mill prices.

Structural Material.—The mills, instead of catching up with their orders, are apparently falling farther behind every week, and now the scarcity is extending to local stocks. For instance, the statement is made that there is not a 5-inch 9½-lb. I-Beam to be obtained anywhere in Chicago at any price. Official prices for delivery from mill, f.o.b. Chicago, in car lots, are as follows: Beams and Channels, 3 to 15 inches, inclusive, 1.76½c.; Angles, 3 to 6 inches, ¼-inch and heavier, 1.76½c.; Angles, larger than 6 inches on one or both legs, 1.86½c.; Beams, larger than 15 inches, 1.86½c.; Zees, 3 inches and over, 1.76½c.; Tees, 3 inches and over, 1.81½c., in addition to the usual extras for cutting to exact lengths, punching, coping, bending or other shop work. Store prices on Angles, Beams and Channels range from 2.10c. to 2.50c., according to quantity on hand in store or obtainable from mill.

Plates.—Consumption is large, mills are overcrowded and prices are unchanged and firm, as follows: Tank quality, ¼-inch and heavier, wider than 14 and up to 100 inches wide, inclusive, car lots, Chicago, 1.76½c.; 3-16 inch, 1.86½c.; Nos. 7 and 8 gauge, 1.91½c.; No. 9, 2.01½c.; Sheared and Universal Mill Plates, Tank quality, 6½ to 14 inches, inclusive, 10c. below these prices; Flange quality in widths up to 100 inches, 1.86½c., base, for ¼-inch and heavier, with the same advances for lighter weights; Sketch Plates, Tank quality, 1.86½c.; Flange quality, 1.96½c. Store prices on Plates are as follows: Tank Plate, ¼-inch and

heavier up to 72 inches wide, 2c. to 2.10c.; from 72 to 96 inches wide, 2.10c. to 2.20c.; 3-16 inch up to 60 inches wide, 2.10c. to 2.20c.; 72 inches wide, 2.35c. to 2.45c.; No. 8 up to 60 inches wide, 2.15c. to 2.25c.; Flange quality, 25c. extra.

Sheets.—The impression is gaining ground that the large stocks which have been carried by both jobbers and consumers are melting away under a growing demand and prospects for Sheet trade a little later in the summer are brightened. Meanwhile prices are more or less demoralized by the existence of surplus tonnages available on old contracts. Prices on car lots and larger, f.o.b. Chicago, average about as follows: Blue Annealed, Nos. 9 and 10, 1.86½c.; Box Annealed, Nos. 18 and 20, 2.16½c.; No. 27, 2.36½c.; No. 28, 2.41½c., with the customary differentials between gauges. Store prices are based on a minimum of 2.10c. for No. 10 Blue Annealed, 2.50c. for Nos. 18 and 20 Box Annealed, 2.65c. for No. 27 Box Annealed and 2.75c. for No. 28 Box Annealed. Galvanized Sheets are quoted in car lots from mill at about the following prices, some mills asking a little more and some offering at \$1 a ton less: No. 10, 2.46½c.; Nos. 17 to 21, 2.81½c.; No. 27, 3.36½c.; No. 28, 3.56½c. Store prices on Galvanized Sheets are as follows: Nos. 10, 12 and 14 are selling at from 3c. to 3.10c., Nos. 22 and 24 at from 3.05c. to 3.15c., No. 27 at from 3.50c. to 3.65c. and No. 28 at from 3.70c. to 3.95c., with intermediate gauges in proportion and with customary differentials for widths and lengths.

Bars.—Conditions are unchanged since last week, with Bar Iron quite firm at 1.50c. to 1.55c., base, half extras, Chicago, in car lots; Bar Steel, officially 1.66½c., Chicago, but actually 5c. to 10c. lower from some quarters; Hoops, 1.81½c., rates, full extras. Soft Steel Angles and Shapes, 1.76½c., half extras, and Hard Steel Angles and Bars at about 10c. below the price for Soft Steel. In store prices Steel Bars and Bands are being held at a minimum of 1.85c., base, half extras; Steel Angles and Shapes, 1.95c., half extras, and Soft Steel Hoops, 2.20c., full extras, with 5c. to 10c. higher than the minimum prices named for small quantities from store.

Merchant Steel.—The only alarm felt by mills at the dilatory tactics of large buyers in the matter of closing season contracts is the fear that the contracting movement may start with such a rush that early specifications will deluge the already well filled mills. Current prices are as follows: Smooth Finished Machinery Steel, 1.91½c.; Smooth Finished Tire, 1.86½c.; Flat Sleigh Shoe, 1.71½c.; Concave and Convex Sleigh Shoe, 1.86½c.; Cutter Shoe, 2.40c.; Toe Calk Steel, 2.23½c.; Railway Spring, 1.86½c.; Crucible Tool Steel, 6½c. to 8c.; special Grades of Tool Steel, 13c. and up; Shafting, 50 per cent. discount in car lots and 45 per cent. in less than car lots in base territory.

Merchant Pipe.—Official discounts named by the leading producer for car lots to consumers are as follows: Black Steel, 73.35; Galvanized Steel, 63.35 Black Iron, 71.85; Galvanized Iron, 61.85, with the customary differentials for larger and smaller diameters and for X and XX strong. Meanwhile the independent mills are adhering quite firmly to the November, 1904, schedule, which rules \$4 a ton lower than the figures just named. An encouraging sign is that specifications and orders being received from jobbers indicate that their stocks are low and need sorting badly.

Boiler Tubes.—There are mills making Iron and Steel Lap Weld Tubes that are able to make prompt shipments, and one newcomer in the market is stated to be making prices ranging two points higher in discount, or \$4 a ton lower in price, than the official figures, in order to induce consumers and jobbers to try their new product. The following discounts in car lots for shipment from mill at Chicago are quoted by the leading producer: Base sizes, ¾ to 5 inches, Steel Tubes, 60.35; Iron, 49.35; Seamless Steel, 50.85. Larger and smaller diameters take the usual extras in price, and less than car lots are quoted at two points less discount. We quote from store:

	Steel.	Iron.	Seamless.
1 to 1½ inches.....	40	35	42½
1½ to 2¼ inches.....	50	35	35
2½ inches.....	52½	35	30
2½ to 5 inches.....	60	47½	42½
6 inches and larger.....	50	35	.

Cast Iron Pipe.—Prices rule weaker, owing to the softness in Pig Iron, but are officially unchanged at \$29 a net ton for 4-inch Pipe and \$28 for 6-inch and larger, with \$1 a ton higher for Gas Pipe.

Old Materials.—The market is passing through transition stage and it is hard to tell whether it will emerge with prices higher or lower than the present. Trading has been so light that it is difficult to establish a market, and there have been no railroad lists closed during the last week up to the time of wiring this report. The St. Paul and the Burlington both have quite large lists to be closed this week, and the prices received will crystallize the market and give something more definite upon which to base quotations in our next issue. We quote:

Old Iron Rails.....	\$17.00 to \$17.50
Old Steel Rails, 4 feet and over.....	12.75 to 13.25
Old Steel Rails, less than 4 feet.....	12.00 to 12.50
Heavy Relaying Rails, subject to inspection.....	22.25 to 22.75
Heavy Relaying Rails, for side tracks.....	19.50 to 20.00
Old Car Wheels.....	14.25 to 14.75
Heavy Melting Steel Scrap.....	11.75 to 12.25
Frogs, Switches and Guards.....	12.00 to 12.50
Mixed Steel.....	10.00 to 10.50

The following quotations are per net ton:

Iron Fish Plates.....	\$14.75 to \$15.00
Iron Car Axles.....	19.50 to 20.00
Steel Car Axles.....	15.50 to 16.00
No. 1 Railroad Wrought.....	13.50 to 14.00
No. 2 Railroad Wrought.....	12.50 to 13.00
Shafting.....	15.00 to 15.50
No. 1 Dealers' Forge.....	10.00 to 10.50
Wrought Pipes and Flues.....	9.25 to 9.75
No. 1 Cut Busheling.....	9.00 to 9.50
Iron Axle Turnings.....	9.25 to 9.75
Soft Steel Axle Turnings.....	9.25 to 9.75
Machine Shop Turnings.....	9.25 to 9.50
Cast Borings.....	7.25 to 7.75
Mixed Borings, &c.....	7.25 to 7.75
No. 1 Mill.....	8.75 to 9.25
Country Sheet.....	7.00 to 7.50
No. 1 Boilers, cut to Sheets and Rings.....	9.25 to 9.75
No. 1 Cast Scrap.....	12.00 to 12.50
Stove Plate and Light Cast Scrap.....	8.50 to 9.00
Railroad Malleable.....	11.75 to 12.25
Agricultural Malleable.....	11.25 to 11.75

Metals.—Business is very quiet and prices are unchanged. We quote Pig Tin 31½c. to 32c. in car lots and 32c. to 32½c. in small lots. Spelter, 5½c. for car lots and 5½c. to 5¾c. for small lots. Casting Copper is 14½c. to 15c.; Lake, 15c. to 15½c. in car lots, with ¾c. to ½c. higher for small lots. Lead is quoted in 50-ton lots at 4.55c., in car lots at 4.60c., and 5c. to 5.25c. in small lots. The new Sheet Zinc schedule is based on \$7, La Salle, for car lots of 600-lb. casks. Car lots, Chicago, are sold on the basis of \$6.75, with small lots selling at from \$7 to \$7.50 per 100 lbs. Prices of Old Copper and Brass are as follows: Copper Wire, 13½c.; Heavy, 13c.; Copper Bottoms, 12c.; Copper Clips, 12½c.; Red Brass, 11½c.; Red Brass Borings, 9½c.; Yellow Brass, Heavy, 8½c.; Yellow Brass Borings, 7½c.; Light Brass, 7c.; Lead Pipe, 4½c.; Tea Lead, 3.85c.; Zinc, 4c.; Pewter, No. 1, 19½c.; Block Tin Pipe, 25c.

Coke.—Connellsville 72-hour Foundry Coke is unchanged at from \$2.25 to \$2.50 at the ovens, or \$4.90 to \$5.15, Chicago. Connellsville Furnace Coke and Foundry Cokes from less favored districts range from 25c. to 50c. lower than these prices.

Cincinnati.

FIFTH AND MAIN STS., June 21, 1905.—(By Telegraph.)

Pig Iron.—We are able to chronicle little change in the situation since our last report. There is no doubt but what there have been more inquiries in the market, notably for Basic and Bessemer. It is apparent, however, that consumers are mostly feeling the market and endeavoring to keep in touch with any changes in schedule that may arise. Foundry inquiry is at a very low ebb and nothing of any special note is being done. Agents report sales of carload lots to consumers needing Iron, which they hope will tide them over the present unsettled condition and place them in a position to take advantage of circumstances when prices shall have again become stable. At present, however, there seems to be no disposition on the part of consumers to take any active interest in the situation and all that can be said is that little hope is entertained of any activity until the middle of July at least. Northern No. 2, which last week we quoted at \$15.25, at furnace, has declined somewhat, and our schedule for this week will be \$15. Southern Irons have also suffered a drop, and \$11.75, which a week since came to the surface in a quiet manner, is now openly made. Indeed, we are compelled to state that we know of one sale that was made to an Indiana concern, consisting of less than 200 tons of Southern Nos. 2 and 4, that was said to have been on an \$11.50, Birmingham, basis, for No. 2. While this was not of sufficient tonnage to firmly establish the latter quotation it is a safe prediction that by the time this letter goes to press other sales will have been made on the same basis, providing, however, that the tonnage is sufficient to justify this shading. Freight rates from Hanging Rock district, \$1.15, and from Birmingham, \$2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	\$15.00 to \$15.25
Southern Coke, No. 2.....	14.50 to 14.75
Southern Coke, No. 3.....	14.00 to 14.25
Southern Coke, No. 4.....	13.50 to 13.75
Southern Coke, No. 1 Soft.....	15.00 to 15.25
Southern Coke, No. 2 Soft.....	14.50 to 14.75
Southern Coke, Gray Forge.....	13.50 to 13.75
Southern Coke, Mottled.....	13.00 to 13.25
Ohio Silvery, No. 1.....	19.50 to 19.75
Lake Superior Coke, No. 1.....	16.65 to 16.90
Lake Superior Coke, No. 2.....	16.15 to 16.40
Lake Superior Coke, No. 3.....	15.65 to 15.90

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....\$18.25 to \$18.50
Lake Superior Car Wheel and Malleable.....18.00 to 18.50

Coke.—Coke is easier, and some business has been done

during the week. A number of contracts have been made for the last half and a better feeling prevails. We quote the best grades of Connellsville Foundry from \$2.25 to \$2.50, f.o.b. ovens.

Plates and Bars.—Considerable new work is being let, and specifications are said to be coming forward in a very satisfactory manner. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.65c., with half extras; the same in smaller lots, 1.90c., with full extras; Steel Bars, in carload lots, 1.63c., with half extras; the same in small lots, 1.85c., with full extras; Base Angles, 1.73c., in carload lots; Beams and Channels, in carload lots, 1.73c.; Plates, ¼-inch and heavier, 1.73c., in carload lots; in smaller lots, 1.90c.; Sheets, 16-gauge, in carload lots, 2.15c.; in smaller lots, 2.70c.; 14-gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; Steel Tire, ¾ x 3-16 and heavier, 1.83c., in carload lots.

Old Material.—Demand for this class of material continues exceedingly quiet, and the indications are that present conditions will continue until later in the year. Prices are about the same as last week. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Railroad Wrought Scrap, \$14 to \$15 per net ton; No. 1 Cast Scrap, \$11 to \$11.50 per net ton; Iron Rails, \$17 per gross ton; Steel Rails, rolling mill lengths, \$12.50 per gross ton; Relaying Rails, 56-lb. and upward, \$22 per gross ton; Iron Axles, \$18.50 to \$19 per net ton; Car Wheels, \$15 to \$16 per gross ton; Heavy Melting Scrap, \$12 per gross ton; Low Phosphorus Scrap, \$15 to \$15.50 per gross ton.

Cleveland.

CLEVELAND, OHIO, June 20, 1905.

Iron Ore.—The movement down the lakes has been such that extravagant estimates are being made of the possible movement of Ore during June, some running as high as 5,000,000 tons, which would seem beyond the possibilities of Lake Erie unloading capacity. Yet the movement is exceedingly active, with the best dispatch being given to boats at both upper and lower lake ports that has been seen in a number of years, while at Lake Erie docks there is an abundance of cars. With the recent adjustment of the yard space adjacent to the docks and the rapid handling of cars some of the older unloading plants are working almost as rapidly as the clamshells. The rates for lake transportation have been steady to strong, at 75c. from Duluth, 70c. from Marquette and 60c. from Escanaba, with boats in good demand.

Pig Iron.—The week has brought some inquiry for Basic, Bessemer and Malleable, with a slight shading of prices. The market shows an uncertain mood, tending downward. On the other hand, the appearance of a good buying order might turn the scale in the other direction. Producers are now working with the higher priced Ores of 1905 and are paying higher wages, which makes them cautious about taking on low priced business. A fair tonnage of Malleable has been sold at \$14.75 to \$15 in the Valley, which is about the ruling quotation on Bessemer, Basic and Malleable. The market is easier, with some of the furnaces willing to take less for odd lots. The Foundry situation is virtually unchanged. Buyers are not ready to contract for the last half and it now develops that some inquiries recently put out have been merely feelers. There is hardly any possibility of a buying movement for the near future. The price holds between \$15 and \$15.50 in the Valley for No. 2. The Coke situation is little changed, save that the better grades are a little harder to obtain. Prices hold at \$2.50 to \$2.75 for the best grades of 72-hour Foundry Coke, with Furnace Coke selling at \$2 to \$2.25 at the oven.

Finished Iron and Steel.—There is a better sentiment but not much of a change in actual market conditions. The belief is expressed that there is a good outlook for business for the last half of the year. Beyond that point but little has developed. The Sheet mills report a strong demand. At present it is hard to tell just how much of this is in anticipation of labor difficulties between the mills and the Amalgamated Association. Many of the smaller mills have receded from their price cutting policy. Base quotations have not changed, being 2.15c. for No. 10 Blue Annealed out of stock; 2.65c. for No. 28 One Pass Cold Rolled and 3.65c. for No. 28 Galvanized. The Billet situation is stronger. Some Forging Billets have been sold here at a premium of \$3.50 a ton. The demand has grown with the report that some of the mills which have been running upon Billets are to be turned into other lines. The increased demand for Standard Rails will require a larger productive capacity in the near future, and this situation has been strengthened by some good business coming from the traction interests in this territory and also from the steam roads which are planning extensions. Bar Iron shows decided improvement. Prices have not changed from 1.50c. to 1.55c. at the mills, but there is a lessening of the low priced competition from the West. This is probably due to increased buying in anticipation of the shutting down of

the mills for the midsummer improvements about July 1. The Steel Bar buyers have not come into the market yet for their next year's needs, but it is thought this movement will not be very long delayed. One of the most favorable indications in the Finished Material market is the greater willingness of buyers to cover their needs at the new prices. This applies especially to the Structural and Plate situations. The buying of Structural Steel continues at the high level which has been recently noted. Further inroads have been made upon the stocks in jobbers' yards, and the smaller mills are getting a good deal of business at premiums running from \$2 to \$4 ton over the association price of 1.60c. at Pittsburgh. No new buying is reported from the lake shipbuilders, but indications are increasing that there will be some large orders from that direction before the opening of the fall trade. Several new business blocks in Cleveland are in advanced stages of development and will soon call for Steel. The market all through is in much better condition than it has been.

Old Material.—The Scrap market is weak and unpromising. Some inquiries have been received of late, but they are of small aggregate, and as mills shut down consumption is curtailed. Improvement work is also increasing the supply. In the absence of any active buying prices are revised, though mostly nominal. We quote, all gross tons: Old Steel Rails, \$13.50 to \$14; Old Iron Rails, \$20 to \$21; Old Car Wheels, \$15; Heavy Melting Steel, \$13.50. All net tons: Cast Borings, \$6.50 to \$7; No. 1 Railroad Wrought, \$14 to \$14.50; No. 1 Busheling, \$12 to \$12.50; Iron Car Axles, \$21 to \$22; No. 1 Cast, \$12.50; Stove Plate, \$8.50 to \$9; Iron and Steel Turnings and Drillings, \$9.

Pittsburgh.

PARK BUILDING, June 21, 1905.—(By Telegraph.)

Pig Iron.—There is perhaps a little more inquiry for Pig Iron. Consumers whose stocks are pretty well worked up are feeling the market, but as yet these inquiries have not resulted in any large tonnage being placed. The ideas of buyers and sellers are far apart and one side or the other will have to give way before any tonnage can be sold. Pig Iron is being piled very fast in the Mahoning and Shenango valleys, and unless the demand soon shows betterment a number of stacks will have to go out. The nominal price of Bessemer and Basic Iron is \$14.50, Valley furnace, or \$15.35, Pittsburgh; but so little tonnage is being sold that it is difficult to quote the market accurately. There is some inquiry for Malleable Bessemer, on which the furnaces quote \$14.50, Valley furnace, but the business has not been placed. There is some inquiry for small lots of Foundry Iron and we quote Northern No. 2 at \$14.75 to \$15, Valley furnace. In the dull condition of the market and the anxiety of the furnaces to sell it is possible that on a firm offer our lower quotation for Foundry might be shaded. There is no demand whatever for Forge Iron and we quote Northern brands at \$14, Valley furnace, or \$14.85, Pittsburgh.

Steel.—There is very little inquiry for Steel and prices are weak. Bessemer and Open Hearth Billets are nominally \$22 and Sheet and Tin Bars \$24, maker's mill. On a firm offer for Billets or Bars for delivery in third and fourth quarters buyers would be able to place contracts at the official prices, which are \$1 a ton less than above.

The Sheet and Tin Plate Conference.—A meeting of the wage committees of the independent Sheet and Tin Plate mills and the Amalgamated Association is in session at this writing. The Amalgamated scale for the year commencing July 1 calls for an advance of about 18 per cent. in Sheet mill wages and 22 per cent. in Tin Plate mills. These demands will be refused by the mills, which will probably insist that the present scale which expires be readopted for the coming year. The conference is likely to be in session for several days.

(By Mail.)

The whole Iron trade, with the exception of Plates and Structural Steel, continues very quiet, with the tendency of prices downward. The demand has been almost at a standstill since May 1, and it is now a question how much longer consumers can stay out of the market, as they have been doing for nearly two months. The consumption of Iron and Steel in its various forms is going along steadily, and there is no doubt that the heavy stocks have been pretty well worked off and that a buying movement is about due. Whether this will come in July remains to be seen, but it is generally expected that tonnage will pick up considerably next month and be in full swing by August. It is true there is no incentive on the part of buyers to place orders ahead, but at the same time it is a fact that prices on some lines of products are low and very close to cost of production. There are reports that material reductions in prices will be made July 1 on some lines of finished products, but these are not confirmed. Whether official prices will be lower on that date is entirely optional with the large interests, who will be

governed in their action by conditions on that date and the general outlook for the future.

The Pig Iron trade is practically lifeless, some of the larger interests not having made a single sale of metal this month. There is some inquiry, but the ideas of buyers and sellers on prices are so far apart that nothing has been done. Standard Bessemer Pig Iron, while nominally held at \$15, at furnace, could be bought at \$14.50 on a firm offer. There is some inquiry for Malleable Bessemer Iron, but prospective buyers offer low prices which prohibit any business being done. There is some inquiry for Foundry Iron in small lots, and Northern No. 2 is held at \$14.75 to \$15, Valley furnace. There is absolutely no demand for Forge Iron, and \$14.50, Valley furnace, could be materially shaded.

The Steel market continues quiet, and with some pressure on the part of mills to sell prices are weak. Bessemer and Open Hearth Billets are nominally \$22 and Sheet and Tin Bars \$24, but on a firm offer and for delivery in third quarter there would be no trouble in buying at official prices, which are \$21 for Billets and \$23 for Bars. The Ohio Works of the Carnegie Steel Company, which has been running on Billets, Sheet and Tin Bars, will go on Billets and Rails after July 1. The demand for Sheet and Tin Bars has quieted down very much, and if a settlement of the Sheet and Tin Plate scales is deferred it will further seriously curtail this branch of business, as the Sheet and Tin Plate mills that sign the scale will close on June 30 unless a wage settlement is reached before that date. The tonnage in Plates and Structural Steel continues heavy, keeping the mills filled up.

Ferromanganese.—The Ferro market seems to be a little firmer and we note a small sale in this market at \$50, delivered. We quote 80 per cent. foreign Ferro at \$49.75 to \$50.25, delivered, the price depending on size of the order.

Rods.—There is practically no inquiry for Rods and we quote Bessemer and Open Hearth at \$33 and Chain Rods \$34, maker's mill. If any business were offering these prices would be shaded.

Steel Rails.—The market is fairly active and the leading Rail mills are comfortably filled for the next several months. Part of the Ohio Works of the Carnegie Steel Company at Youngstown will go on Rails on July 1. Reports that a new Rail mill is to be built by the Carnegie Steel Company at Bessemer are untrue. We quote Standard Sections at \$28, at mill. Demand for Light Rails is quiet and prices are easier. We quote these at \$22.50 to \$25, depending on weight.

Skelp.—The market continues very quiet and some of the mills are hunting business actively. We quote Bessemer Grooved Skelp at 1.50c. to 1.55c. and Open Hearth 1.55c. to 1.60c., with \$1 advance for Sheared. Grooved Iron Skelp is about 1.60c., and Sheared 1.67½c. to 1.70c., maker's mill.

Plates.—The amount of new tonnage being placed in Plates is not as large as a month or so ago, but the mills are filled up for some time ahead and with new tonnage coming in from car builders and other consumers steady operation of the large Plate mills through the summer months is assured. There is still considerable tonnage in Plates and other shapes to be used in lake freighters which has not yet been placed. We quote: Tank Plates, ¼ inch thick, 6½ to 14 inches wide, 1.50c., base; over 14 inches wide and up to 100 inches in width, 1.60c., base, at mill, Pittsburgh. Extras over the above prices are as follows:

	Extra per 100 pounds.
Gauges lighter than ¼-inch to and including 3-16-inches Plates on thin edges.	\$0.10
Gauges No. 7 and No. 8.	.15
Gauge No. 9.	.25
Plates over 100 to 110 inches.	.05
Plates over 110 to 115 inches.	.10
Plates over 115 to 120 inches.	.15
Plates over 120 to 125 inches.	.25
Plates over 125 to 130 inches.	.50
Plates over 130 inches.	1.00
All sketches (excluding straight taper Plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches).	.10
Complete Circles.	.20
Boiler and Flange Steel Plates.	.10
Marine, "A. B. M. A" and ordinary Fire Box Steel Plates.	.20
Still Bottom Steel.	.30
Locomotive Fire Box Steel.	.50
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within ten days from date thereof, discount of ¼ of 1 per cent. is allowable. Pacific Coast base, 1.40c. f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 inches wide down to 6 inches of Tank, Ship or Bridge quality.

Structural Material.—A good many contracts are being placed, and while they are usually small yet they aggregate a large tonnage. The mills are still from six weeks to two months behind in deliveries and on Open Hearth stock are further behind. A good deal of work is coming up in moderate sized buildings and tonnage placed this month will

probably be as large as in May, which was a banner month. We quote: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 x $\frac{1}{4}$ inch thick up to 6 x 6 inches, 1.60c.; Angles, 8 x 8 and 7 x 3 $\frac{1}{2}$ inches, 1.70c.; Zees, 3-inch and larger, 1.60c.; Tees, 3-inch and larger, 1.65c. Under the Steel Bar card Angles, Channels and Tees under 3-inch are 1.60c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Sheets.—Interest attaches to the meeting of the Wage committees of the independent Sheet mills and the Amalgamated Association, to be held in this city to-morrow (Wednesday). It can be said now that the Sheet mills will oppose the 16 per cent. advance in wages asked and will probably insist on the present scale, which expires June 30. New demand for Sheets is very quiet and unless it soon improves some of the Sheet mills will have to close down before long for lack of orders. We quote: Black Sheets, box annealed, one pass through cold rolls, No. 24 gauge, 2.10c.; No. 26, 2.20c.; No. 27, 2.20c.; No. 28, 2.30c. We quote Galvanized Sheets as follows: Nos. 22 and 24, 2.75c. to 2.85c.; Nos. 25 and 26, 2.95c. to 3.05c.; Nos. 27, 3.13c. to 3.23c.; No. 28, 3.35c. to 3.45c. We quote No. 28 Gauge Painted Roofing Sheets at \$1.65 to \$1.75 per square, and Galvanized Roofing Sheets, No. 28 Gauge, at \$2.85 to \$2.95 for 2 $\frac{1}{2}$ -inch corrugation. Jobbers charge the usual advances over above prices for small lots from store.

Iron and Steel Bars.—A moderate amount of new tonnage is being placed, but the mills are running mostly on contracts taken some time ago on the 1.30c. basis for Steel. Jobbers who are fortunate enough to have such contracts are endeavoring to move stocks out freely and are offering concessions of about \$2 a ton over mill prices to do this. In fact, the amount of tonnage in Steel Bars that has been sold on the 1.50c. basis is nominal, the large trade having loaded up at the lower prices and are now disposing of these stocks. The settlement of the wage scale with the Republic Iron & Steel Company insures the operation of its mills, which are said to be fairly well supplied with orders. We quote Common Iron Bars at 1.55c. to 1.60c., Pittsburgh, the lower price being made only by a few mills and on desirable specifications. We quote Bessemer and Open Hearth Steel Bars at 1.50c., base, for carloads and larger lots, but, as noted above, most of the contracts on the books of the mills are at lower prices, and jobbers are also shading this price to a slight extent.

Hoops and Bands.—We understand that a large tonnage of Hoops and Bands has been taken by some of the mills for delivery ahead. We quote Steel Hoops at 1.65c., Bands 1.50c., with usual extras, and Cotton Ties 85c. per bundle for 3000-bundle lots and over. The tonnage in Cotton Ties this year is expected to be much heavier than last year.

Tin Plate.—There is very little new demand for Tin Plate, and jobbers continue to shade prices about 10c., or to \$3.40 a box, base, on what little new business is being offered. The mills continue to quote \$3.50 to \$3.55, base, f.o.b. Pittsburgh, terms 30 days or 2 per cent. off for cash in 10 days. As noted above, jobbers are shading this price about 10c. a box.

Spelter.—There is practically no demand for Spelter, and as some of the larger consumers are getting ready to close their mills about July 1 for inventory and repairs the outlook is not bright. We quote prime grades of Western Spelter at 5.05c. to 5.10c., St. Louis, or 5.17 $\frac{1}{2}$ c. to 5.22 $\frac{1}{2}$ c., Pittsburgh.

Merchant Pipe.—There is no noticeable change in the condition of the Pipe trade, the demand for Merchant sizes being quiet, with absolutely no inquiry for Oil country goods. On the larger sizes the mills are well filled up for several months. Outside mills continue to quote prices equal to about 78 per cent. off to the larger trade. Discounts to consumers in carloads, which the outside mills are shading at least two points, or \$4 a ton, are as follows:

Merchant Pipe.			
		Steel.	Iron.
		Black.	Galv.
Per cent.	Per cent.	Per cent.	Per cent.
1 $\frac{1}{2}$ and 1 $\frac{1}{4}$ inch.....	67	51	65
1 $\frac{1}{2}$ and 2 $\frac{1}{2}$ inch.....	71	59	69
2 $\frac{1}{2}$ to 6 inches.....	75	65	73 $\frac{1}{2}$
7 to 12 inches.....	70	55	68 $\frac{1}{2}$
Extra strong, plain ends.			
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ inch.....	60	48	58
2 $\frac{1}{2}$ to 4 inches.....	67	55	65
4 $\frac{1}{2}$ to 8 inches.....	63	51	61
Double extra strong, plain ends, 1 $\frac{1}{2}$ to 8 inches.....	56	45	54
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Boiler Tubes.—The demand continues heavy and the mills are from four to six weeks behind in deliveries. Carload discounts are as follows:

Boiler Tubes.	Iron.	Steel.
1 to 1 $\frac{1}{2}$ inches.....	41	44
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ inches.....	41	56
2 $\frac{1}{2}$ inches.....	46	58
2 $\frac{1}{2}$ to 5 inches.....	53	64
6 to 13 inches.....	41	56

Merchant Steel.—Specifications on contracts are coming in fairly well, but new business is light, consumers hold-

ing off placing contracts, believing they may be able to do better by waiting. There is still some irregularity in prices of Shafting. We quote: Toe Calk Steel, 2c. to 2.05c.; Railway Spring Steel, 1.65c. to 1.70c.; Finished Tire, 1.65c. to 1.70c.; Sleigh Shoe, 1.50c. to 1.55c.; Smooth Finished Machinery Steel, 1.70c. to 1.75c.; Cutter Shoes, 2.20c. to 2.25c.; Crucible Tool Steel, ordinary grades, 5 $\frac{1}{2}$ c. to 7c.; special grades of Tool Steel, 10c. and upward. There is a fair demand for Shafting, discounts for Cold Rolled being 50 per cent. off in carloads and 45 per cent. in less than carloads, delivered in base territory.

Railroad Spikes.—The demand continues quite heavy and the two local mills are well filled up with orders for several months ahead. We quote Railroad Spikes at \$1.70 to \$1.75 per 100 lbs., in carloads, f.o.b. maker's mill.

Coke.—On account of the blowing out of so many blast furnaces it is probable that a large number of Coke ovens in the Connellsville region will go out of blast within the next week or two. The H. C. Frick Coke Company, which has not been a seller of Furnace Coke in the open market for a long time, will put out a number of ovens in the near future. Some low prices are being made for spot shipment. Strictly Connellsville Furnace is being offered at \$1.75 to \$1.85 a ton at oven, while 72-hour Foundry is ranging from \$2.35 to \$2.50 a ton at oven. In the cheaper grades of Coke Furnace is being offered as low as \$1.50 and Foundry at \$2 to \$2.10, at oven. We note a contract for 1000 tons of Foundry Coke per week, taken by a local concern, at \$2 a ton at oven. The Coke is not strictly Connellsville, but is of high grade. On Connellsville Furnace Coke for delivery over last six months \$2 to \$2.10, at oven, is quoted on 72-hour Foundry, and about \$2.50, at oven, is asked. Out of about 30,000 ovens in the Upper and Lower Connellsville regions over 3000 are idle and a large number of Coke plants are running only four days a week. We learn that some relatively low prices are being made for Crushed Coke.

Iron and Steel Scrap.—There is practically no demand for Scrap of any kind and prices have shown a sharp decline. It is hoped that the demand will improve in July, after the mills have made repairs and taken inventory, but in the meantime consumers refuse to take in Scrap at any price. Dealers quote as follows: Heavy Melting Scrap, \$13.50 to \$13.75; No. 1 Wrought Scrap, \$15.50; Cast Iron Borings, \$7 to \$7.50; Cast Steel Scrap, \$13.50 to \$14; Wrought Iron Turnings, \$9.50; Bundled Sheet Scrap, \$12; Old Steel Rails, short pieces, \$13.50; long pieces, \$14, all in gross tons, f.o.b. cars Pittsburgh. We do not hear of any recent sales of Scrap in this market.

Birmingham.

BIRMINGHAM, ALA., June 19, 1905.

The past week would have been one of reported small transactions in the Iron market but for the action of the Tennessee Company, which reported the successful closing of deals that involve 55,000 tons of Steel Rails. The sales made were for delivery in 1906. The price obtained is given out as "private terms" and nothing better than a guess concerning it can be given at this writing, but the fact that the sale was concluded is evidence that things are looking up again. The Tennessee Company could have increased the amount materially had it been in the humor to do so. The trade received the information with great satisfaction and is full of the belief that it will have a good influence on the market. It was a big trump and played at a time when it looked as if the buyers had the game.

Gossip had it that there was also a sale made by the same interest of 15,000 tons of Basic Iron to large Western buyers. As corroborative of the report it was known, or at least reported, that a certain sales agency was dickering for that amount. When the report came of its successful conclusion it was accepted as correct. The Tennessee Company is the only company here that could accept such an order and its sales agent denies its correctness. There is *prima facie* evidence that more Iron was again sold than was reported.

One interest reports the acceptance of orders that aggregated over 1000 tons on a basis of \$12.50 for No. 2 Foundry. Another interest sold a lot of Gray Forge that had accumulated, amounting to 500 tons, on the basis of \$12.50. There were other sales on the same basis, and in some cases higher prices were obtained when the lots were of a retail character. For instance, \$13 was obtained for car lots of No. 1 Foundry, and in some cases that price was gotten for No. 2 Foundry when quick shipment was demanded. The inquiry improved materially, and while there is manifest reluctance on the part of some sellers to report their concluded transactions, it is safe to say they showed an increase over the preceding week. They could do that and yet not show what would be dubbed as activity. Nearly all the transactions were for nearby delivery and mature not later than the third quarter. Some of the interests are pretty well sold up to July and August, and they are in a condition to hover around the market and go in only when favorable opportunities tempt. There are others who would

not wait for opportunity to offer, but would seize it on passage.

There has been a change in the management of the Lookout Iron Company. J. G. Battelle, who was the president and general manager of the company, has resigned his office on account of larger interests elsewhere, and the active management of affairs will be assumed by the vice-president, G. B. McCormack.

It is announced that Furnace No. 6, the new furnace of the Tennessee Company at Ensley, made a run in one day the past week of 402 tons. Your correspondent has been officially notified that the new furnace of the Woodward Iron Company would be blown in this week. It will be a close second to the Tennessee furnace and has the latest improvements.

Coke has been in good demand since last reported and some sales have been made at maximum quotations. It is quoted all the way from \$3.50 to \$4. In reply to a query as to the advance in Coke a large handler said he knew only one cause and that was the stocking up of some interests to provide against any injurious action of the miners, whose annual conventions are being held. For Foundry Coke \$4 is yet the price. A good part of the Furnace Coke now being supplied the district is coming from Virginia. Coal is still quoted at \$1 to \$1.25 run of the mines and at the mines.

The Scrap Iron market was reported as rather quiet the past week and there are a few changes in quotations:

Stove Plate.....	\$8.50 to \$9.00
Heavy Cast.....	10.50 to 10.75
Old Iron Rails.....	17.00
Old Steel Rails.....	12.00 to 12.50
Open Hearth Steel Scrap.....	12.50
Iron Car Axles.....	16.00
Steel Car Axles.....	13.50 to 14.00
Old Car Wheels.....	14.00 to 15.00
Relaying Rails, light.....	22.00 to 23.00
Relaying Rails, heavy.....	24.00 to 25.00
Railroad Wrought.....	15.00 to 16.00

The Alabama Car Service Association shows that for the month of May the cars handled amount to about 63,000, as against 60,500 for the corresponding period last year, an increase of 1500. The prospect for a better showing this month is so far very good.

The State Fair managers have let the contracts for the necessary buildings, to be ready for occupancy next September. There were only a few incorporations the past week and they were insignificant from a financial standpoint.

The report of the Convict Board shows that for the nine months ending May 31 the convicts' earnings amounted to \$334,680. Their maintenance cost, \$156,000, so there was a net profit to the State of nearly \$200,000. This is the only way to make some of our citizens useful members of the brotherhood of man.

An official of the Southern Railway Company was here the past week looking over the depot site and announced that in the course of three or four weeks the plans would be ready and work would then commence without delay.

Some development has commenced in the Ore fields in the Leeds territory and will be prosecuted with energy. Both the Tennessee Company and H. F. De Bardeleben are interested in and are parties to the development.

The Pratt Consolidated Coal Company has been making rapid strides and is now having a daily output of 7500 tons of Coal. This will be increased. That means if the necessary labor can be obtained.

(By Telegraph.)

BIRMINGHAM, ALA., June 20, 1905.—The order of United Mine Workers of this district unanimously adopted to-day the scale of wages for mining Coal that prevailed the past year with the commercial operators, and it was accepted by the operators, to be in force the coming year. Those interests running open mines were not approached, and the strike against them will be continued; they are as firm as ever in maintaining their position. The Alabama Consolidated Coal & Iron Company is the only furnace company signing a contract with the miners' organization. The Iron market is very quiet.

Philadelphia.

FORREST BUILDING, June 20, 1905.

The Iron market has had rather a bad slump during the past week, a condition not likely to terminate until after the midsummer holidays. It is a disappointment of course to have to sit waiting for business to come in, but in the meanwhile the tension is relieved by the fact that the manufacturing end is still busy, with only a very moderate relaxation from the activity experienced during the first quarter of the year. There is also a strong conviction that another forward movement is not a long way off, but in any case the need for immediate business is not urgent anywhere. Naturally the order books are beginning to look slim and will need some replenishment within the next six or eight weeks; but that business will be forthcoming in due season is very confidently believed. Meanwhile the adjustment of prices will have to be dealt with, as no general demand need

be expected until it is reasonably certain that prices have reached something approaching to rock bottom figures. In some cases they are certainly down to that already, but there is a range of \$1 to \$1.50 in the quotations for Pig Iron, and buyers will have to find out what prices are rock bottom to them individually. This depends of course on how much Iron they want, the kind they want and when it is to be delivered. Prices in this respect are a little illusive, as, for instance, a No. 2 X Foundry has been sold, delivered here, at \$15.50, while in other cases \$17 is not an unusual figure. In the former case it was a spot lot, but no one wants to sell Iron for forward delivery at a figure like that. The final outcome will probably be somewhere between the extreme figures named, and should not be less than midway, as many furnaces cannot make Iron for less than \$16 to \$16.50, Philadelphia. The price of Ore is irretrievably fixed; labor has been advanced and is so scarce that it cannot be reduced; so that the cost of Iron will leave no margin at less than the figures above named. Furnaces are already curtailing their output, and it is believed that in a couple of months' time the supply will be so well controlled that prices will again begin to show an upward tendency. But there is little prospect for anything but a dull market during the next few weeks, which may, however, present fine opportunities at the bargain counter.

Pig Iron.—To say that the market is dull hardly defines the situation, as it is more nearly dead. There is more inquiry, however, and buyers are at least disposed to ask for quotations, although making very few bids. The weak spot in the market is Southern Irons, which are openly quoted at \$16 for No. 2 X Foundry, and report says they are selling at least when the right kind of a buyer can be found. These quotations quite upset the general market, so that it is almost impossible to give exact quotations without stating all the circumstances attending the transaction. For small lots of Standard Iron \$17 to \$17.25 has been the usual price for No. 2 X Foundry, but during the past few days about 25c. less has been the average of sales, and for good sized lots bids of \$16.50 would not run much risk of refusal. The last named prices are so near to actual cost that further reductions (if made at all) are not likely to be permanent, as a curtailment in production has already commenced and will be continued until the demand is something in proportion to the offerings. Consumption keeps up remarkably, but there will naturally be some decrease during the hot weather, as it is impossible for men to work when the heat is as great as it was during the past two or three days, and it will not be safe to expect any improvement in that respect for a good many weeks to come. Meanwhile, however, prospects are extremely satisfactory and it should cause no surprise to find the development of some such buying movement as there was during the first quarter of the year, although in a lesser degree. The idea during the early portion of the year was that there would be a scarcity of Pig Iron, but the demonstrated fact that the country can produce 2,000,000 tons per month under a little pressure has pretty well eliminated the idea of an insufficient capacity. But contracts are beginning to run out and renewals will be imperative, and as they will be likely to all come in a bunch sellers will find themselves in a much stronger position than they are in to-day. It is a remarkable fact that during all the recent dullness there have been no requests to postpone shipments. In most cases there is a continued clamor to ship more promptly, and in one case a request has been made that a 3000-ton lot sold for October, November and December delivery should if possible be shipped during July, August and September. This is pretty good evidence that the underlying conditions are sound and that the temporary abstention in buying has no significance, except that prices have not reached a point at which buyers find that they can get in on rock bottom quotations, but it is no easier to guess when they are at bottom than it is when they are at top. It is impossible to give to-day's prices with much certainty, but the extreme figures would be within the following range for Philadelphia and nearby deliveries:

No. 1 X Foundry.....	\$17.25 to \$17.50
No. 2 X Foundry.....	16.50 to 17.00
No. 2 Plain.....	15.75 to 16.00
No. 3 Foundry.....	15.00 to 15.25
No. 4 Foundry.....	14.75 to 15.00
Standard Gray Forge.....	15.00 to 15.50
Basic, nominal.....	16.00
Low Phosphorus.....	20.50 to 21.00
Southern No. 2 X Rail.....	16.00 to 16.25
Southern No. 2 X Rail, on dock.....	15.50

Steel.—There is a very good demand, and there is no difficulty in getting \$26 to \$26.50 for fair sized lots and a little more for small lots. There is something of a pressure for prompt shipments in view of the near approach of the midsummer holidays and consequent suspension of work during the first half of the month.

Muck Bars.—There is no business upon which to base quotations, which are purely nominal at \$27.50 to \$28.50, according to delivery.

Plates.—The demand for Plates shows excellent conditions in everything pertaining to railroad work, while there is perhaps a little slackening in the demand for miscellaneous

purposes. Mills as a rule are very full of work and likely to continue so indefinitely, although those running on the lighter class of work are not doing as much as they could if the business was there. Prospects are favorably regarded, however, and prices remain as last quoted—viz.:

	Part Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel, over 14 inches wide	1.73½	1.78½
Tank, Bridge and Boat Steel, rectangular Plates, 14 inches wide and under	1.63½	1.68½
Flange or Boiler Steel	1.83½	1.88½
Marine, A. B. M. A. and Commercial		
Fire Box Steel	1.93½	1.98½
Still Bottom Steel	2.03½	2.08½
Locomotive Fire Box Steel	2.23½	2.28½
The above are base prices for $\frac{1}{4}$ -inch and heavier. The following extra apply		Per 100 3-16-inch thick.....\$0.10 pounds extra.
Nos. 7 and 8, B. W. G.	.15	"
No. 9, B. W. G.	.25	"
Plates over 100 to 110 inches	.05	"
Plates over 110 to 115 inches	.10	"
Plates over 115 to 120 inches	.15	"
Plates over 120 to 125 inches	.25	"
Plates over 125 to 130 inches	.50	"
Plates over 130 inches.....	1.00	"

Structural Material.—This department of business seems to run on parallel lines with Plates and is in excellent condition. Some sections of material can hardly be had at any price, as the mills are months behind with their deliveries, while in ordinary Sections there is comparatively little trouble in getting anything that may be required. Prices unchanged as follows: Beams, Channels and Angles, 1.73½c. to 1.85c., according to specifications, and small Angles, 1.65c. to 1.68c.

Bars.—The market has relapsed into its usual midsummer dullness, and many of the mills are beginning to find themselves short of orders. A suspension of work, which will begin on the first of the month, may help to clean up stocks, but at present the demand is rather slow. Prices are unchanged at 1.63½c. for Best Refined Iron or for Bessemer Steel, but the feeling is easy and prices are hardly as strong as makers could desire.

Sheets.—The demand is very good and mills are running to their full capacity in order to make the deliveries that are called for. Prices are steady and unchanged, as follows: 18 to 20 gauge, 2.30c.; 22 to 24 gauge, 2.40c.; 25 and 26 gauge, 2.50c.; 27 gauge, 2.60c., and 28 gauge, 2.70c.

Old Material.—The market shows no signs of recovery and prices for some articles are again lower. There is more demand, however, one lot of 5000 tons of Old Steel Rails having been sold at \$15, delivered to a local mill, besides good sized lots of Heavy Melting Stock at \$14 and smaller lots up to \$14.25. Bids and offers are about as follows for deliveries in buyers' yards:

Scrap Rails.	\$15.00 to \$15.25
No. 1 Steel Scrap	14.00 to 14.50
Old Steel Axles	16.50 to 17.50
Old Iron Axles	21.00 to 22.50
Old Iron Rails	18.00 to 19.00
Old Car Wheels	14.50 to 15.00
Choice Scrap, R. R. No. 1 Wrought	15.50 to 16.00
No. 1 Yard Scrap	14.00 to 15.00
Long and Short	13.00 to 14.00
Machinery Scrap	14.00 to 14.50
Wrought Iron Pipe	12.00 to 12.50
No. 1 Forge Fire Scrap	12.00 to 12.50
No. 2 Light Ordinary	10.00 to 11.00
Wrought Turnings	10.00 to 11.00
Axle Turnings, Choice Heavy	12.50 to 13.00
Cast Borings	8.00 to 8.50
Stove Plates	9.00 to 10.00

New York Pig Iron Warrant Market.

NEW YORK, June 21, 1905.

The market for pig iron warrant certificates on the New York Produce Exchange was considerably more active the past week, with sales of 1700 tons. Of this amount 400 tons foundry, February delivery, were sold at \$15.25. Other transactions were: Cash, 100 tons, \$14.60; June, 100 tons, \$14.40, and 100 tons, \$14.50; July, 100 tons, \$14.50; 100 tons, \$14.55, and 800 tons, \$14.60. The following quotations were established on call Wednesday noon:

Regular.			Foundry.	
	Bid.	Asked.	Bid.	Asked.
Cash	\$14.30	...		
June	14.50		\$14.90	\$15.50
July	14.45	\$14.75	14.90	15.40
August	14.40			
October	14.40	15.00	15.00	15.40
November	14.40	15.00	...	...
December	14.40	...		
February	14.50	...	15.00	15.40

The British Admiralty has received 14 bids for an experimental torpedo boat destroyer. Two American firms are among the bidders. The destroyer, according to the specifications, must have a guaranteed speed of 36 knots, equal to more than 40 miles an hour. She must have turbine machinery and be fitted for oil fuel.

New York.

NEW YORK, June 21, 1905.

Pig Iron.—The local market is very quiet, and prices are dependent entirely upon whether the buyer needs some particular brand for his mixtures or whether he purchases in the open market. In the latter case low figures are obtainable. The local strike of foundry helpers and laborers is of little importance. Southern Irons are being offered at lower figures. We quote for Northern Irons, at tidewater, \$16.25 to \$17.50 for No. 1 Foundry, \$16.25 to \$17 for No. 2 Foundry and \$15.75 to \$16.25 for No. 2 Plain. Southern Iron is selling on the basis of \$15.75 to \$16 for No. 2 Foundry, with a downward tendency.

Steel Rails.—No large sales are reported by the mills. We continue to quote \$28 for Standard Rails, nominally, and \$23 to \$25, at mill, on Light Sections.

Cast Iron Pipe.—Trade is inclined to be quiet, the only business of consequence reported for the week being a Newark contract for 1200 tons, which was taken by an Eastern foundry. New York City will open bids for quite a good tonnage July 5. The demand for small lots is not nearly so active as it has been. Carload lots are quoted at \$27 per net ton for 6-inch, at tidewater.

Finished Iron and Steel.—The American Bridge Company booked some important contracts during the past week, chief among which was the Philadelphia Rapid Transit order for 24,000 tons. This order had been virtually secured for several weeks, but it is now at last on the books of the bridge company as an actual contract. Among the other noteworthy orders taken by the company during the week were the Steel for the Clafin Building on Thirty-fourth street, New York City, requiring 3000 tons, and several structures in Chicago involving about 2500 tons. A great deal of small work is being received every day by the company from every part of the country, and the tonnage for this month will probably be fully as good as for either of the two preceding months. The Baltimore Bridge Company has secured from the United Fruit Company a contract for a sugar refinery at Nipe Bay, Cuba, taking 2300 tons. The Engineering Building in this city, which will take 2900 tons of Steel, is not yet placed under contract, although bids were opened on Tuesday. The Manhattan Bridge project over the East River is rapidly getting ripe and advertisements for proposals will soon be out. The demand for Structural Material of all kinds is still considerably in excess of the capacity of the mills, and deliveries appear to be more backward from week to week. The Plate trade is in good condition, with the mills well supplied with work and prospects very favorable for the continuance of the demand. In this immediate vicinity a fair amount of tonnage is coming out from day to day, although the local shops using Plates could handle a great deal more business than is coming to them now. A considerable quantity of Plates will be required for two new vessels which have been placed under contract with the W. & A. Fletcher Company, Hoboken. One of these is a steamship for the New York and Boston service which will be fitted with a Parsons turbine. The other vessel is for river service between New York and Albany and will be considerably larger than any of the vessels now engaged in this service. Bar Iron is a trifle lower and business is somewhat lighter. A meeting of the Eastern Bar Iron makers will be held in this city on Thursday. Quotations, at tidewater, are as follows: Beams, Channels, Angles and Zees, 1.74½c. to 1.84½c.; Tees, 1.79½c. to 1.89½c.; Bulbs, Angles and Deck Beams, 1.84½c. to 1.94½c.; Sheared Tank Plates, 1.74½c. to 1.84½c.; Flange Plates, 1.84½c. to 1.94½c.; Marine, 1.94½c. to 2.04½c.; Fire Box, 1.94½c. to 2.50c., according to specifications; Refined Bar Iron, 1.59½c. to 1.64½c.; Soft Steel Bars, 1.64½c. to 1.74½c.

Old Material.—The only branch of this trade which shows any strength is that of Relaying Rails. This class of material continues in excellent demand and good prices are realized for sections that meet buyers' requirements. A little business is reported in some classes of rolling mill stock, such as Wrought Pipe and Cast Borings, but generally buyers in this line are making inquiries and feeling the market rather than making actual purchases. The foundries are doing very little in Cast Scrap and prices are lower. The impression now prevails that the existing dullness may run well into the middle of July, and in the meantime the market may sag still lower. Prices per gross ton, New York and vicinity, are approximately as follows:

Old Iron Rails	\$17.00 to \$18.00
Old Steel Rails, rerolling lengths	13.25 to 14.25
Old Steel Rails, short pieces	13.00 to 14.00
Relaying Rails	20.00 to 21.00
Old Car Wheels	15.00 to 16.00
Old Iron Car Axles	18.00 to 19.00
Old Steel Car Axles	16.50 to 17.50
Heavy Melting Steel Scrap	13.00 to 14.00
No. 1 Railroad Wrought Scrap	15.50 to 16.50
No. 1 Yard Wrought Scrap	14.00 to 15.00
Iron Track Scrap	13.00 to 14.00
Wrought Pipe	11.00 to 12.00
Ordinary Light Iron	7.50 to 8.50
Cast Borings	7.00 to 7.50
Wrought Turnings	10.00 to 11.00
No. 1 Machinery Cast	13.50 to 14.50
Stove Plate	11.00 to 12.00

Metal Market.

NEW YORK, June 21, 1905.

Pig Tin.—On Thursday and Friday a fair amount of business was done, sales being chiefly confined to small lots at a going price of 30.37½c. A continuance of this was noted on Monday at the higher level of 30.50c., but since then the market has been very dull. The gradual upward trend in prices during the last three weeks has been attributed to speculative influences in London, but it cannot be denied that the statistical position of the metal warranted a somewhat higher level of prices. A retrospective view of the situation for the past several months shows a period of dull business, broken now and then by occasional good days, when a fair amount of orders were secured by jobbers. During this time the metal has been maintained at a comparatively high level, which indicates either the work of powerful speculative influences or a rate of consumption such as to warrant these prices. To-day's closing prices on the London Exchange show an advance from last week and £139 5s. is quoted for spot, with £137 15s. for futures. In New York to-day's closing prices are 30.50c. to 30.60c. for spot and June and 30.15c. to 30.45c. for July delivery. The arrivals so far this month are 1625 tons and the afloats 2388 tons.

Copper.—Domestic consumers continue to buy small quantities of Copper as their needs warrant, and this continued hand to mouth buying is undoubtedly responsible for the firm undertone to the market. The quotations are nominally unchanged at 15c. for prompt shipments of both Lake and Electrolytic and 14.75c. for Casting grades. A comparative statement of the apparent consumption of Copper in the United Kingdom for the first five months of this year is 31,747 tons, as compared with 39,192 tons during the corresponding period last year. In London business has been extremely quiet, as on Monday there were no sales of either spot or futures recorded, an almost unprecedented occurrence on that exchange. Spot and future deliveries are higher at £66 2s. 6d., with Best Selected at £70 10s. The exports so far this month aggregate 12,256 tons, of which 600 tons were for Oriental consumers.

Pig Lead.—The consumption of Lead is apparently heavy, but business in the local market is very quiet and prices are unchanged at 4.50c. to 4.60c. The American Smelting & Refining Company's quotations remain unchanged at 4.50c. for shipment Lead in 50-ton lots. In St. Louis the price is 4.42½c. to 4.47½c., while in London the price is unchanged at £13.

Spelter.—After a slight flurry last week the market relapsed into its customary dullness and 5.35c. is the general quotation for spot, while for June, July and August delivery 5.25c. to 5.35c. is quoted. In St. Louis the market is unchanged and shipment Spelter is held at a basis of 5.07½c.

Antimony.—The demand is very light on account of the continuance of the high prices, all grades now being held at 11c. to 11½c.

Quicksilver.—The price continues unchanged at \$38 per flask of 75 lbs. in lots of 100 flasks. In London Rothschild's price is £7 7s. 6d., second hands offering at the same quotations.

Nickel.—The market continues quiet, but the principal producer continues to open new fields for the consumption of this metal, and prices are held firm at 40c. to 45c. per lb. for large lots.

Tin Plate.—The jobbing trade report a good business and Terne Plates are fast entering into consumption. Coke Plates are being accumulated at the mills in anticipation of the canning season. Prices are unchanged at \$3.74 a box for 100-lb. IC Coke Plates. In Swansea a decline of 1½d. has taken place and the quotation now is 11s. 4½d.

As yet no contracts for equipment have been placed for the new Bessemer plant, sheet, bar and billet mills, to be built by the Youngstown Sheet & Tube Company, Youngstown, Ohio. The Morgan Construction Company, Worcester, Mass., is engineer for the sheet, bar and billet mills.

Current reports that the H. C. Frick Coke Company is negotiating for the purchase of the W. J. Rainey Coke Company interests in the Connellsville regions are officially denied. No such negotiations are under way nor are they contemplated. The Frick Coke Company has blown out 10 per cent., or about 1700, of its coke ovens in the Connellsville region, due to the falling off in demand for furnace coke caused by the blowing out of a number of blast furnaces of the Carnegie Steel Company.

The Conventions of the Master Mechanics and Master Car Builders.

The annual conventions of the American Railway Master Mechanics' and the Master Car Builders' associations have been held this year for the first time at Manhattan Beach, Long Island, N. Y. This is a return to the old custom of meeting at the seashore which prevailed until recent years, when the associations have convened at Saratoga. The Master Mechanics' Association held its meetings on Wednesday, Thursday and Friday, June 14, 15 and 16, and the Master Car Builders' had the three days from Monday, June 19, to Wednesday, the 21st.

The task of arranging for the conventions and providing entertainment was, as usual, attended to by the Executive Committee of the Railway Supply Men's Association, headed by C. W. Martin, Jr., of Jenkins Bros., New York. The other members of the committee for this convention were: S. F. Pryor, Simmons Hardware Company, St. Louis; W. M. Simpson, general manager of the Railway Materials Company, Chicago; F. A. Barbey, New England representative of Thos. Prosser & Son; F. K. Shults, Eastern sales agent of the Camel Company; D. C. Noble, president of the Pittsburgh Spring & Steel Company, Pittsburgh; Charles Herron, Southern representative of the American Brake Shoe & Foundry Company; J. F. Symington of the T. H. Symington Company, Baltimore, and the secretary of the committee, J. Alexander Brown, manager of the Pocket List of Railroad Officials, New York, secretary and director of exhibits at the recent American Railway Appliance Exhibition at Washington.

The most interesting proceedings of the Master Mechanics' Association at the opening session included a report on the "Proper Loading of Locomotives" and one on the "Locomotive Tests" made by the Pennsylvania Railroad Company at St. Louis last summer. Topical discussions at this same session covered the subjects "Best Known Dimensions for Water Space Around the Fire Box to Produce a Minimum Consumption of Fuel and Replacement of Fire Box Sheets and Reasons for the Same," opened by Lawford H. Fry, Baldwin Locomotive Works, and "Locomotive Stokers," opened by William Garstang. H. H. Vaughan presented a paper on a very live and timely subject, "The Value of Superheated Steam for Locomotive Work."

At the second session reports were discussed on "Locomotive Driving and Truck Axles and Locomotive Forgings," "Shrinkage Allowance for Tires" and "Motive Power Terminals." A paper on "The Technical Education of Railroad Employees: The Men of the Future," was presented by George M. Basford, editor of the *American Engineer and Railroad Journal*. Topical discussions included "High Speed Steel," opened by J. A. Carney, and "Staybolts." A report on "Flexible Staybolts" was also discussed.

At the closing session, Friday, the discussions were upon reports on "Water Softening for Locomotive Use," "Service of Locomotives," "Shop Layouts," and a paper by C. B. Young, divided under two headings, "The Proper Lubrication of Valves When Drifting" and "The Relative Setting for Piston and Slide Valves." The following were the topical discussions: "Relief and By-pass Valves for Locomotives," opened by A. E. Manchester, and "Are Engines with Self Cleaning Front Ends Satisfactory?" opened by E. W. Pratt.

The election of officers for the ensuing year was the concluding event of the American Railway Master Mechanics' Association convention, the following being those chosen: H. F. Ball, Lake Shore & Michigan Southern, president; J. F. Deems, Vanderbilt lines, first vice-president; William McIntosh, Central Railroad of New Jersey, second vice-president; H. H. Vaughan, Canadian Pacific, third vice-president; Angus Sinclair, editor *Locomotive Engineering*, treasurer; G. W. Wildin, Erie; C. A. Seely, Chicago, Rock Island & Pacific, and A. E. Mitchell, Lehigh Valley, members of the Executive Committee for two years; A. E. Manchester, Chicago, Milwaukee & St. Paul; J. F. Walsh, Chesapeake & Ohio, and F. H. Clarke, Chicago, Burlington & Quincy, members of the Executive Committee for one year.

A number of interesting subjects were also treated

at the meetings of the Master Car Builders. Those brought up at the opening meeting Monday, June 19, included discussions of reports on "Revision of Standards and Recommended Practice," "Triple Valve Tests," "Brake Shoe Tests" and "Air Brake Hose"; topical discussions on "The Best Method of Preventing or Minimizing the Damage to Metal Parts on the Right of Way from Salt Water Drippings," opened by C. A. Schroyer, and "Method of Riveting Yokes," opened by William McIntosh.

At the session on the following day consideration was given to reports on "Tests of M. C. B. Couplers," "Revision of Rules for Loading Long Materials," "Rules of Interchange, Including Reports of Arbitration Committee and Passenger Car Rules;" "Arch Bars," "Safety Appliances," "Tank Cars," "Steam Connections," "Repairs of Steel Cars" and "Stenciling Cars." Topical discussions covered "The Establishment of a Standard Height from Top of Rail to Center of Drawbar for Passenger Equipment Cars," opened by T. H. Curtis, and "Is It Advisable to Use Malleable Iron for Wearing Surfaces?" opened by T. A. Fogue.

At the closing session Wednesday there were discussions of reports on "Coupling Chains," "Draft Gear," "Guarantee for Cast Iron Wheels and Doors," and topical discussions as follows: "How Does the M. C. B. Cast Iron Car Wheel Show Up in Service as Regards the Breakages of Flanges?" opened by R. L. Ettinger; "Do We Need Greater Braking Power on Freight Cars?" opened by F. N. Gilbert. At the time of going to press the election of new officers had not taken place.

The exhibition of machinery and railroad appliances, which has been a feature of growing importance in connection with the conventions of these associations, this year surpassed its predecessors in interest and attractiveness. The following is a partial list of the exhibitors:

American Brake Shoe & Foundry Company, Mahwah, N. J.
American Nut Lock Company, Boston, Mass.
American Steam Gauge & Valve Mfg. Company, Boston, Mass.
Bethlehem Steel Company, South Bethlehem, Pa.
Boker & Co., Herman, New York.
Bridgeport Safety Emery Wheel Company, Bridgeport, Conn.
Browning Engineering Company, Cleveland, Ohio.
Bullard Automatic Wrench Company, Providence, R. I.
Carborundum Company, Niagara Falls, N. Y.
Chicago Pneumatic Tool Company, Chicago, Ill.
Cleveland City Forge & Iron Company, Cleveland, Ohio.
Cling-Surface Company, Buffalo, N. Y.
Coe Brass Mfg. Company, Ansonia, Conn.
Crosby Steam Gauge & Valve Company, Boston, Mass.
Dearborn Drug & Chemical Works, Chicago and New York.
Diamond Machine Company, Providence, R. I.
Dixon Crucible Company, Jos., Jersey City, N. J.
Eaton, Cole & Burnham Company, Bridgeport, Conn.
Electric Controller & Supply Company, Cleveland, Ohio.
Electro-Dynamic Company, Bayonne, N. J.
Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio.
Foster, the Walter H., Company, New York.
Foster Engineering Company, Newark, N. J.
Garlock Packing Company, Palmyra, N. Y.
General Electric Company, Schenectady, N. Y.
Goldschmidt Thermit Company, New York.
Greene, Tweed & Co., New York.
Helwig Mfg. Company, St. Paul, Minn.
Independent Pneumatic Tool Company, Chicago and New York.
Jenkins Bros., New York.
Johns-Manville, H. W., Company, New York.
Keystone Drop Forge Works, Chester, Pa.
Landis Machine Company, Waynesboro, Pa.
Landis Tool Company, Waynesboro, Pa.
Magnolia Metal Company, New York.
Mason Regulator Company, Boston, Mass.
Morse, Williams & Co., Philadelphia, Pa.
Nathan Mfg. Company, New York.
New Jersey Tube Company, Newark, N. J.
Norton Grinding Company, Worcester, Mass.
Pedrick & Ayer Company, Plainfield, N. J.
Rand Drill Company, New York.
Robins Conveying Belt Company, New York.
Russell, Burdsall & Ward Bolt & Nut Company, Port Chester, N. Y.
Schoen Steel Wheel Company, Pittsburgh, Pa.
Shelby Steel Tube Company, Pittsburgh, Pa.
Sprague Electric Company, New York.
Standard Pressed Steel Company, Philadelphia, Pa.
Starrett Company, the L. S., Athol, Mass.
Transue & Williams Company, Alliance, Ohio.
Vandyck, Churchill Company, New York.
Walworth Mfg. Company, Boston, Mass.
Westinghouse Air Brake Company, Pittsburgh, Pa.
Westinghouse Automatic Air & Steam Coupler Company, St. Louis, Mo.

Westinghouse Electric & Mfg. Company, Pittsburgh, Pa.
Williams, J. H., & Co., Brooklyn, N. Y.
Woods Machine Company, S. A., Boston, Mass.
Yale & Towne Mfg. Company, New York.

British and German Trade Conditions.

LONDON, June 10, 1905.—The general condition of business in all the great centers the past month has been lifeless, and consumers of crude iron have, to a great extent, kept out of the market. Upon the collapse of the warrant corner there is no need to enlarge. The question to be considered is how far the fall will proceed before consumers are satisfied that it is safe to begin buying again.

For some years we have had small stocks in warrant stores, and, more important still, these stocks were the dregs of large quantities—practically the leavings after all the best iron had been picked out. Although warrant iron could be bought at considerably less money than makers' iron, yet no one cared to take advantage of the difference, because he could not know what he might get. Now this is all altered. There are over 400,000 tons of Cleveland iron in store, all of which has been put there within the last year, and there is to be found among it plenty of iron of the very best brands.

But there is more than this in the new situation. For some years the stock of pig iron has been so low that bears have never had a free hand to operate. They will now be in a position to act freely upon their views as to the future of the market, and already we see some of the effect of this new freedom in the tendency of merchants to sell ahead without regarding too closely the prices at which they can buy from makers.

The export trade suffered somewhat severely during the continuance of the Cleveland corner; foreign buyers were quite unwilling to operate. We are now waiting with more or less impatience for Continental buyers to come in and take what they probably would have taken in March and April had the market been in a normal condition.

An Interesting Letter from Germany.

The correspondent of a Midland paper, writing from Germany on June 7, says that there is no mistaking the present boom in pig iron throughout Germany, and particularly in Silesia. The demand for pig iron in Upper Silesia is constantly increasing and is running especially keen on steel and foundry descriptions. The output is sold to the end of the year, and a good number of orders have been booked for the first quarter of next year. One of the leading producers of the district, who carried heavy stocks for the last two years, has entirely cleared them, and many furnaces which have been constantly on the market as sellers for several years have withdrawn, as they require the whole production now for their own steel mills, and are even buying iron in fair quantities. The pig iron syndicate has no iron to sell for reasonably early delivery.

During the last two years or so the only change made in Luxembourg pig iron has been an advance of 1 to 2 marks in foundry qualities. It is therefore considered a significant event that prices of Luxembourg puddling pig have just been raised 2 francs per ton, from 56 to 58 francs, for delivery during the third quarter of this year. The rise in Luxembourg, together with the higher prices for coal and other accessories, raises the cost price of bars, &c., about 2 shillings 6 pence per ton.

S. G. H.

In the absence of a quorum no decision was reached yesterday by the Board of Directors of the Bethlehem Steel Corporation on the plans for enlargement which are under consideration. A tract of land adjoining the works at South Bethlehem has been purchased recently. The company is reported to be earning large profits.

The Tennessee Coal, Iron & Railroad Company is building a large additional open hearth furnace at Ensley, Ala., with removable roof, so that sculls and heavy scrap can be readily handled into it.

The Machinery Trade.

NEW YORK, June 21, 1905.

Though slightly below the average of May the machinery trade continues in a satisfactory condition, with a normal June business. Regarding the large projects before the trade, there were no new developments beyond the fact that the Public Service Corporation of New Jersey has not yet issued specifications for the large amount of machinery required for its new shops. Within the next two weeks the Brooklyn Rapid Transit Company expects to call for bids for the machine tool equipment for its new East New York shops.

New York machinery merchants were gratified at having the conventions of the Master Mechanics' and Master Car Builders' associations at Manhattan Beach during the last week. They have taken advantage of the close proximity of these important events, and at all times during the meetings a number of representatives of the important machinery houses made the Oriental Hotel their rendezvous. Some business was transacted, but more important than this is the fact that the reports of the railroad men and carbuilders were unanimous in showing that an unusually large amount of business may be expected from these quarters within the next few months.

The increasing demand in recent years for electric equipment of all kinds has resulted in a good business and substantial profits to both manufacturers and dealers. At this time of the year, when general machinery lines are not in demand as much as they might be, the electric motor manufacturers especially have much on which to congratulate themselves. Many factory owners have of late adopted the motor drive system in running their machines, and the popularity of this method of furnishing power has given the electric motor dealers large returns. A large proportion of the factories in course of construction in the vicinity of New York will be equipped with motor drives, and many shops being brought up to date are being similarly provided. The recent announcement that the General Electric Company and the Westinghouse Electric & Mfg. Company had fallen out over the question of prices sent a tremor through the trade, and for a time there were rumors of price cutting, and in a number of instances, especially in the West, actual cases of underselling were reported. The demand for the line proved to be so good, however, that little was done in the way of reducing prices and neither of the alleged contestants adopted starvation tactics. Now that the dealers have decided that there will be no selling war and that the strained relations of the two companies will have no ill effect on the trade, steady and normal prices prevail and plenty of sales are being recorded. Of course there are some grumblers who expected summer sales to equal those of the winter, and naturally their expectations have not been realized. On the whole, however, dealers are well satisfied with trade conditions.

Ganz Alternating Current Traction System.

The equipment of railroads with electricity has come into such popular favor with numerous railroads that the Railway Electric Power Company, which has just been formed to introduce into this country the three-phase alternating current traction system, which has been developed in Europe by the engineering firm of Ganz & Co. of Budapest, will make a bid for business in that line. The Railway Electric Power Company has acquired all the patents and manufacturing rights of the Ganz Company for the United States, Mexico, Cuba and all the West Indies, other than those under British supremacy. This announcement is an important one to machinery circles here, as the company will either have to erect a plant to build its own equipment or else have the work done by one of the large electric companies. It is understood that the company is already negotiating with one of the large railroads near New York with a view to installing its system here. Much is claimed for the Ganz system in the way of cheap initial cost and operation, and the success it has met with in Europe is sufficient to gain the attention of railroads contemplating a move toward electrifying their lines. The directors of the company are: John E. Borne, president of the Colonial Trust Company; William L. Bull of Edward Sweet & Co.; Henry Seligman of J. & W. Seligman & Co.; Stephen Peabody; H. R. Duval, chairman of the American Beet Sugar Company; Leopold Wallach of Wallach & Cook; Henry L. Sprague of Stetson, Jennings & Russel; Gustav Lindenthal, former commissioner of bridges, and Gustave Leve. L. B. Stillwell, electrical director of the Interborough Rapid Transit Company, and Frank N. Waterman are the consulting engineers for the new company, and the former returned from Europe a few days ago, where he investigated the Ganz system, and made a favorable report on it to his principals. Mr. Leve, who had much to do toward perfecting the organization of the company and making the arrangement with the Budapest concern, in speaking of the project, had this to say:

"The large initial cost of converting steam railroads on this side of the Atlantic has been a veritable stumbling block to the various managements considering a change of

motive power. The installation of the three-phase system costs about 40 per cent. less than that of direct current, which is the prevailing mode of traction installed by the large American electrical companies. Another important claim made for the three-phase system is that it is the only method which provides for recuperation of power on down grades. In other words, the power usually wasted in breaking and coasting down grades is by this system returned to the line as useful energy for handling other trains. It furthermore saves the wear and tear in rails, brake shoes and wheel tires caused by mechanical breaking. The most striking illustration of the three-phase system is the 65-mile Valtellina line of the Italian State Railways, which has been inspected by electrical engineering experts from all over the world. The operating cost has been reduced by upward of 50 per cent. over steam locomotive operation, which formerly was the power used. The Ganz people have lately perfected the three-phase system so that if necessary three-phase equipment can be run over connecting lines already installed with direct or single phase current."

The construction of a high speed electric road from Newark, N. J., to New York has been planned by the Public Service Corporation of New Jersey, and actual preparations toward making plans and getting estimates on the cost of the proposed improvement have been begun. The scheme will in all probability necessitate the doubling of the power house now being constructed on the Hackensack meadows by the Public Service Corporation, and the vast amount of work that will have to be done in connection with the carrying out of the project will mean much to the machinery trade hereabouts. It has not been decided as yet what means will be used in getting from Jersey City into New York, but in all probability the McAdoo tunnel will be used. The road will be a subsurface line, according to an announcement made by Thomas N. McCarter, president of the Public Service Corporation, and it has been decided to tunnel the Passaic River at Newark and perhaps the Hackensack between Essex and Hudson counties. There will be no grade crossings at Newark or Jersey City, and the road will be partly elevated and partly below grade. A portion of the line in Jersey City will be through a subway, and some part of the road may be along the bed of the Morris Canal if the canal is abandoned at a later date. A plot of ground at Park place and Canal street, Newark, has been purchased for a terminal there, and the upper floors of the proposed building will be used as offices. A private way across the Hackensack meadows has been secured, and other rights of way have been bought with a view to constructing the line as straight as engineering skill can make it. The location of the terminal at the Manhattan end of the proposed line has not been decided upon as yet, although the proposed terminal of the tunnel at Tenth and Hudson streets will be used. The power house on the Hackensack meadows, which is nearly completed, will in all probability be duplicated to take care of the new enterprise, and as the plans show that it will eventually be eight times the size of the structure now being erected other extensions can be looked for as the company grows. The building now being completed is 180 feet square. There are ten boilers, each having 660 horse-power capacity, and engines of 8000 kw. capacity. The machinery for the power house, as the present plans call for, is being delivered and the Public Service Corporation's engineering force will soon be in shape to duplicate the power house. Mr. McCarter left on Tuesday night for the Middle West and Northwest on a two weeks' trip to be spent in inspecting high speed electric roads there.

The question of operating the New York & Long Branch Railroad by electricity is said to have been under discussion for some time among the directors, and it is not improbable that in the near future action will be taken toward that end. Such action on the part of the railroad would mean a great deal to makers of electrical apparatus in this vicinity, as most of the purchasing would, in all probability, be done in New York. The tendency on the part of railroad managements to run trains at increased speed and the demand on the part of the public for quick train service will have much to do with influencing the railroad company toward taking the step, and it is conceded by the interested parties that such a system would be a great benefit to the road. The New York & Long Branch Railroad controls 38 miles of track, and it is operated jointly by the Pennsylvania Railroad and the Central Railroad of New Jersey. In the summer season especially there is considerable travel on the road and many people commute from points along the line to New York.

Important Machinery Requirements.

Bids will be asked within the next two or three weeks by the Brooklyn Rapid Transit Company for a large quantity of machinery to be installed in its new East New York shops at Fulton street, Jamaica avenue and Broadway, Brooklyn, N. Y., where the company intends to expend about \$1,000,000 on improvements. At the present time John G. Walker, who has charge of the mechanical equipment, is laying out the machines and will shortly send out specifications. It will be remembered that the improvements at that point will include a main repair shop, 70 x 350 feet, two stories

high, with an inspection shed on one side 150 feet wide, running the entire length of the building; also power shop, paint shop, oil house, &c. The equipment will consist of modern machinery, including many wall cranes, a 50-ton electric traveling crane and a power plant of 250 horse-power capacity.

The Union Twist Drill Company, successor to Gay & Ward, Athol, Mass., is now purchasing new machine tools for its plant. Plans for the company's new building will soon be completed.

The extensive purchases of machinery which have been made of late by the United Fruit Company, which has its main offices at Boston, but maintains a purchasing department with other offices at 6 Battery place, New York, will shortly be augmented by additional demands on the market for equipment for a large sugar refinery which is to be built at Nipa Bay, Cuba. This plant is to be one of the largest, if not the biggest, of its kind on that island, and it will be put in operation as soon as possible. The United Fruit Company has for some years past been an important factor in the development of the sugar industry of Cuba. It has been quietly acquiring properties throughout the island and has in contemplation a number of projects along those lines. The plant at Nipa Bay will be capable of handling 5000 tons of cane a day. An order has been placed with the Baltimore Bridge Company for the building, which will contain 2300 tons of steel. The company has the contract for erecting the refinery, and the price to be paid the Baltimore concern it is understood reaches well up into six figures. This is exclusive of the machinery details, which are in the hands of Hugh Kelly, 81 Wall street. Mr. Kelly has been representing the United Fruit Company as the purchasing agent for some time past, and in consequence he has placed considerable business with New York machinery men. It is said that the United Fruit Company and the Cuba Company, which concerns are closely allied, have evinced a tendency of late to give to American machinery houses business which formerly went to foreign concerns. It is probable that in addition to power machinery, crushers and other machines used in the production of sugar will be bought in large quantities before long. It is said that the United Fruit Company has another large project in contemplation for the Island of Jamaica, where it already has extensive holdings, but no information will be given out officially in that respect as yet. Mr. Kelly, who also represents the Cuba Company, which has its main offices at 80 Broadway, New York, recently closed contracts for a new mill to be erected at Jatibonico, Cuba. This company is the concern with which Sir William Van Horn has been prominently identified, and a large proportion of its purchases for Cuban industries has gone to foreign machinery men. It is said the American manufacturers have to an extent competed with British and Germany machinery men and of late have been able to capture some substantial orders for Cuban shipment. The movements of the United Fruit Company will no doubt be followed closely for a time by New York dealers, as the project in question is only part of the company's plans of extension.

The Wm. J. Oliver Mfg. Company, Knoxville, Tenn., which has during the past few years been a large purchaser of machinery, intends to erect an extensive addition, which will necessitate the installation of quite an amount of new machinery. The company has purchased for \$50,000 a plot of ground where it proposes to erect a car wheel foundry, the construction of which will cost in the neighborhood of \$60,000. The new plant will be an accessory to the present car works of the company and will be equipped with modern machinery. When this new extension will have been completed the car works will have cost nearly \$500,000.

The Middletown Car Works, Middletown, Pa., has lately received so many orders that it has determined to enlarge its plant by the erection of a wood working shop, 70 x 250 feet, on ground to the rear of its plant, the addition to be ready for operation some time in September. Not much new machinery will be required, as the company intends to transfer its equipment from crowded quarters to the new building, operating it there by electric power. This change will practically double the erecting shop space, which is at present too small.

It is probable that considerable new machinery will soon be purchased by the Montreal Steel Works, Limited, Montreal, Canada, which is spending about \$200,000 enlarging and improving its plant. The money will be spent chiefly on extensions to the molding and finishing department of its steel casting plant, and a considerable amount of the expenditure will be used for the installment of labor saving machinery of the best type.

The C. H. Wheeler Condenser & Pump Company, 26 Cortlandt street, New York, has sold a car lot of steam pumps for shipment to Yokohama, Japan.

Tunnel and Power Work.

The coming of the hot weather has demonstrated the necessity for the installation of a complete ventilating system in the New York Subway, and steps are to be taken by

the Rapid Transit Commission, as well as the Interborough Rapid Transit Company, to devise and install the proposed system. It is admitted, however, that there can be no improvement this year, and all that can be done now will be to prepare the plans, obtain the needed appropriation and install whatever system is adopted, so that it will be made available next year.

It seems that plans are progressing favorably for the construction of the Michigan Central Railroad tunnel under the Detroit River, work on which is expected to be begun late in the fall. This tunnel is to be built somewhat along the lines of the Pennsylvania Railroad tunnels under the East and North rivers and will require a very heavy tonnage of iron castings. The tunnel will cost in the neighborhood of \$10,000,000. There is a movement on foot to erect a foundry in the vicinity of the terminal of the tunnel on the Canadian side across from Detroit for making the castings, in order to save the heavy duty which would have to be paid on the rings cast in this country. Some prominent people in that section think that this is a good opportunity for the beginning of a large foundry.

Ground has been broken for the addition which the New York Edison Company is to have erected to its power station and office building at 55 Duane street, and the work of construction will shortly be begun. The company proposes to use the upper part of the structure for office purposes and the power station on the ground floor will be extended. It will install several converters, it is understood, and it is probable that while most of the machinery requirements for the extension have been arranged for, the company will probably make some smaller purchases for the plant. Plans have been filed with the Department of Buildings for a power station to be constructed at 452 West Twenty-seventh street, at a cost of \$50,000. Some large converters will be installed there, and there may be some purchases for that plant. It is stated that no additional steam power will be installed and within three years it is announced that the company will get all its power from its waterside plant and the steam power at the power house on Duane street will be dispensed with. The company has purchased the four 20-ton cranes from Wonham & Magor, New York. Bids on the cranes were asked several weeks ago.

The Philadelphia & Western Railroad, Philadelphia, Pa., is receiving bids for the construction of a 15,000 horse-power generating station for its line now under construction between Sixty-third and Market streets, Philadelphia, and Wayne, Pa. The location of the plant, which is expected to cost in the neighborhood of \$1,000,000, has not yet been fully decided upon.

T. P. Howell, leather manufacturer, Newark, N. J., who is building a new plant, is in the market for power plant equipment. About 500 horse-power is required.

A steam boiler in the compressed air plant of the Subway Contracting & Construction Company at 161st street and the North River, New York, blew up on Sunday and destroyed the entire plant. The company will replace the plant as soon as possible.

The incinerating plant at Forty-first street and the North River, Manhattan, where is generated 250 horse-power from rubbish, having proved a complete success, Commissioner of Street Cleaning Woodbury is planning the erection of two new plants, with the view of eventually lighting the city buildings and possibly some of the streets by electricity generated from waste, of which 150,000 tons is gathered each year in the city. The new plants, which are to be built at Ninetieth street and the East River, Manhattan, and in Long Island City, will call for engines and dynamos capable of producing 100,000 horse-power. The new incinerating plant under the Williamsburg Bridge, which is expected to generate 400 horse-power, part of which is to be used in lighting the bridge, is almost ready for operation. It will be remembered that the city purchased an entire block between Ninetieth and Ninety-first streets and Avenue A and the East River for one of the new patent plants.

Business Changes.

Branches in New York and Philadelphia have been opened by the Union Twist Drill Company, successor to Gay & Ward, Athol, Mass. The store at 54 Warren street, New York, is under the management of F. M. Van Gelder and the one at 52 North Fifth street, Philadelphia, Pa., is under the management of Field & Co. The company was recently organized to manufacture milling and gear cutters for all purposes and will carry a complete stock in both of its new branches.

The Independent Pneumatic Tool Company, which has taken over the plant of the Aurora Automatic Machinery Company, Aurora, Ill., and is producing the Thor pneumatic tools and appliances, has opened principal offices in the First National Bank Building, Chicago. This will be the headquarters of John D. Hurley, well-known in pneumatic tool circles, who is second vice-president of the Independent Company. The Eastern office of the company has been

located at 170 Broadway, New York. It will be recalled that well known in railway supply circles is James B. Brady, president of the company. W. O. Jacquette, first vice-president of the company, will be in charge of the New York offices.

New England Machinery Market.

WORCESTER, MASS., June 20, 1905.

There appears to have been something of a let up of business during the past week or so. The machinery dealers are complaining that business is not so good with them as it has been, but they express no surprise over the change, for the extreme hot weather of last week was the start of the vacation season, which means the usual summer quiet. The manufacturers of machine tools are finding things much as the dealers are. Business has let up quite materially with some of them, and with some others who are still running full on orders the amount of new business has diminished. Individual instances may be found where the demand continues first rate and without diminution. On the whole the outlook for the immediate future is for a lighter business generally. The same statement is true as to industries outside of metal lines in New England. Every one expects that when the tide turns again it will reach a much greater height than it has during the first half of the year.

The gray iron foundries of New England are only fairly busy. They can handle a good deal more work than they have at the present time, a fact that the New York foundrymen might take advantage of in case of need.

Sargent & Co., hardware manufacturers, New Haven, Conn., have planned a large extension to their already great works. The building planned is to be about 50 x 600 feet and five stories, and the foundations are being put in for one section of the structure to be 237 feet long and this will be finished as soon as possible. A large smokestack, 135 feet high, will be erected. Plans and specifications are out for 950 horse-power of steam boilers.

The W. A. Choate Mfg. Company, Albany, N. Y., manufacturer of school furniture, is to erect a factory at Wilmington, Vt. The main building will be 50 x 120 feet and either two or three stories. The company is a new one, with capital stock of \$30,000, residents of Wilmington being largely interested. W. A. Choate is the president of the corporation. Both steam and water power will be used, and a water wheel and boilers are already available. The engine and all other equipment of the shop will be purchased.

The Kitson Machine Company, Lowell, Mass., has been incorporated under Massachusetts laws, with a capital stock of \$1,500,000. This is another step in the merging of cotton machinery interests which has been alluded to from time to time in this column. Robert F. Herrick, a Boston attorney, who was active in bringing together the several companies concerned, is the president of the new corporation; Haven C. Perham is treasurer and Albert B. White the clerk. The other companies immediately concerned are the Saco & Pette Machine Shops, Newton Upper Falls, Mass.; the Atherton Mfg. Company, Pawtucket, R. I., and the Lowell Machine Shops, Lowell, Mass. The trade is looking to further announcements, which are expected to include other cotton machinery companies.

Harvey Hubbell, Bridgeport, Conn., manufacturer of machinery, machine tools and electrical specialties, is planning to erect a substantial addition to his shops in that city. It is not his purpose to equip with new machinery, but tools will be bought from time to time as required. The building will be used to give more floor space for present machinery as well as larger plating and polishing room.

Landers, Frary & Clark, New Britain, Conn., manufacturers of cutlery and hardware, are to make large additions to their plant. One new building will be 50 x 130 feet and three stories and there will be two one-story buildings 20 x 42 feet, to be used as steam houses. The larger addition will be devoted to the manufacture of goods with celluloid handles. There is no truth in the published story that the company will manufacture its own celluloid.

The Pratt & Cady Company, Hartford, Conn., manufacturer of valves and hydrants, has completed what is believed to be the largest water valve in the world, and it is now being installed in one of two 9-foot penstocks connecting with the 18-foot pipe of the Niagara Construction Company, at Niagara Falls. The duplicate of the big valve will be built from the same plans. These valves will control a turbine generating 10,000 horse-power. It is a colossal valve, as will be seen from these dimensions: Diameter of opening, 9 feet; length over all, 26 feet; width, 11 feet; height, 7½ feet; weight complete, 126,000 pounds. It will be operated by a Westinghouse type C squirrel cage motor, using a 220-volt, three-phase, 25-cycle current, and running at a speed of 750 revolutions and capable of developing 30 horse-power. There is an automatic arrangement for cutting out the current when the valve is fully closed or fully opened. Under test without calking or plugging at any point the valve proved to be absolutely tight. It does not differ in mechan-

ical construction from other large valves which the Pratt & Cady Company has manufactured in the past.

The Stanley Electric Mfg. Company, Pittsfield, Mass., is to build material enlargements to its plant, consisting of an addition for the die making department, 30 x 112 feet; an addition for storage, 30 x 176 feet, and an addition for the machine department, 50 x 127 feet.

The Harvard Novelty Company, Leominster, Mass., is establishing a factory to carry on an electroplating business and will produce the decorative metal work in gold, silver and nickel for combs, the manufacture of which is an important industry of Leominster. The proprietor is George R. Farrell, North Cambridge, Mass. A part of the Williams & Winn factory has been rented. Some machinery and equipment has been purchased, but the company has yet to install power presses, foot presses, shearing machines, squaring shears and trip hammers.

The Rocky River Power Company, New Milford, Conn., has been incorporated by act of the Connecticut Legislature to develop extensive water power, the charter authorizing the distributing of electric power in most of the towns of Litchfield County. The incorporators are A. G. Barnes and F. M. Williams, New Milford; W. S. Morton, Hartford, and J. H. Roraback, North Canaan. The contracts for the various power equipment, hydraulic and electric, have not been let. W. S. Morton, 36 Pearl street, Hartford, is in charge of the details as hydraulic engineer.

The Ridgefield Electric Company, Ridgefield, Conn., is being organized to establish an electric lighting plant. The company will be capitalized for \$74,500, of which \$40,000 will be stock and the balance bonds. It is proposed to build a substantial brick power house, in which will be installed two engines, two generators and two boilers, to form a duplicate plant throughout. The committee in charge of the organization is: George M. Olcott, chairman; Henry B. Anderson, Dr. R. W. Lowe and George L. Rockwell.

Chicago Machinery Market.

CHICAGO, ILL., June 20, 1905.

Outside of two or three large deals machinery business has been quiet for the past week. The order for about \$50,000 worth of machine tools for the new plant of Chalmers, Williams & Co. was divided among several machinery houses here. It is generally understood among the machinery houses that the large Santa Fe list, which was promulgated a number of months ago, will be closed this week or next. Contracts for a greater part of the equipment required by the South Side Elevated road for its new power house were closed during the week. Boiler shop tools required by the Kennicott Water Softener Company for its new plant have not yet been purchased so far as can be learned, nor have deals been closed for the large requirements which will go into the new plant of the Morden Frog & Crossing Works.

The Niles-Bement-Pond Company received the lump order for all the machinery thus far closed by the Illinois Central Railroad, amounting to \$108,802.05. About \$11,000 worth of machinery remains to be placed, and this will be done in the next few days.

The Cutler-Hammer Clutch Company, Milwaukee, Wis., which recently completed a three-story addition to its plant, aggregating more than 50,000 square feet of floor space, is now starting operations on a second three-story addition, which will have about 35,000 square feet of space. This gives the firm practically the entire block bounded by Twelfth and Thirteenth streets, St. Paul avenue and the railroad tracks. The firm has also built a new brass foundry across St. Paul avenue from the present plant, and later on will erect warehouses there also. As soon as the additions are completed a large number of new tools will be required. The company is finding a very large sale for its magnetic accelerators, switchboards and electrical apparatus generally.

Brown Brothers, Spokane, Wash., boiler makers and sheet metal workers, will replace a building recently destroyed by fire with a two-story structure, 70 x 90 feet. Power and tool equipment has not yet been decided on.

The Rapid Motor Vehicle Company, Pontiac, Mich., has purchased a strip of land on Franklin avenue consisting of 20 acres and having a railroad frontage of 1500 feet. On it will be built a factory of cement block construction, 60 x 500 feet, and two stories high. There will also be built a large power house and a testing house, both being constructed of the same material as the main building. Besides a battery of boilers and an engine some large generators will be installed, as the company will operate its own electric light plant. The railroad frontage not thus occupied will be reserved for future expansion of the plant. The balance of the tract will be subdivided into lots, on which will be constructed homes for employees.

The Diamond Crystal Salt Company, St. Clair, Mich., will this summer buy a duplicate set of boilers and stokers to add to those already in use. This purchase will probably consist of four 333 horse-power Wickes vertical water tube

boilers with Murray automatic stokers. An overhead concrete coal bin will be erected between the two sets of boilers.

The United States Gypsum Company has practically completed its new plant at Robey street and Blue Island avenue, Chicago, and expects to be fully in operation by August 1. It will be remembered that the old works of this company at South Chicago were completely destroyed by fire last October. The new plant consists of six buildings, as follows: Main building, 115 x 135 feet, part two stories and part three stories high; power house, 26 x 85 feet, two stories, and four smaller structures, 24 x 50, 24 x 60, 24 x 80 and 30 x 90 feet, respectively. The last mentioned building is three stories high and the others one. For the power house two 60-inch x 16-foot boilers have been purchased from S. Freeman & Sons, Racine, Wis., and a 14 x 48 inch Harris-Corliss engine. A generator is to be added, but its size has not been determined. A complete system of dryers, mixers and other special machinery used in the manufacture of gypsum has also been bought and the larger part of it installed. The plant when completed will have a capacity of 400 tons daily. In its construction special provision was made for a large storage capacity, as most of the raw material is brought in by lake, and large quantities must be laid in to provide against the suspension of navigation during the winter season. The plant is located on slip D of the south branch of the Chicago River and has Chicago, Burlington & Quincy track connection. The site occupies about 240 x 350 feet.

Joseph T. Ryerson & Son, Chicago, report the sale of two bevel shears to the Erie Railroad and Cleveland bending rolls to the Kansas City Boiler Works, Kansas City, Mo.

H. W. Caldwell & Son Company, Chicago, issues a leaflet in which it illustrates what is described as the largest boring mill in Chicago, a mill which is being erected in the plant of that company by the Niles Tool Works Company. The tool weighs 160,000 pounds and will turn sheaves, pulleys, &c., 20 feet diameter by 96-inch face.

The Prescott Steam Pump Company, West Allis, Wis., has recently taken an order for a triple expansion mine pumping engine with a capacity of 1200 gallons per minute against a 1000-foot head for the El Cobre mine at Santiago, Cuba. A striking feature of this order is the fact that the pumping end will be built entirely of bronze, in order to resist the action of acidulous mineral water, about 60,000 pounds of bronze being required in this one pump.

Philadelphia Machinery Market.

PHILADELPHIA, PA., June 20, 1905.

There has been but little change of conditions in the local machinery market during the past week. A fair run of day to day business, mostly composed of single tools and small lots, has been transacted, but no contracts of any size have been closed. Railroad business has made up quite a good proportion of the business done in the heavier tools, the greater part being for general equipment and for replacement. Some of the manufacturing plants continue to take on enough business to keep them working up to their full capacity, and here and there we find some who can take orders for extended deliveries only; in other cases, however, business received from day to day is being depended upon to keep plants in full operation. Inquiries are generally reported as numerous, although there seems to be considerable shopping around in some cases and quotations are frequently subject to more than one revision before the business is finally placed. The various shipyards keep fairly busy and it is reported that several contracts for freight liners of considerable size for the Honolulu trade are shortly to be placed.

There is not much change in the foreign trade; in some lines it has slightly improved, but there are no indications at present toward any general resumption of the trade.

Steel castings appear to be in demand and foundries are in some instances being pushed for deliveries. Gray iron machinery castings are also in active demand, but the general run of iron castings can stand material improvement.

Work has been started on a five-story factory building and a one-story power house at Hurley street and Allegheny avenue for the Pine Tree Silk Mills. Wm. Steele & Sons have the contract. The factory will be 97 x 252 feet ground plan, while the power house will measure 22 x 95 feet.

The Philadelphia Roll & Machine Company is exceedingly busy, the demand for sand and chilled rolls as well as for charcoal iron castings being the heaviest the concern has ever noted. Some departments are regularly working overtime in order to meet deliveries. The new addition to the company's machine shop has been completed and considerable machinery has already been installed. This addition will greatly facilitate the finishing of rolls and other castings. Orders for over 300 rolls are now on its books, as well as many for general castings and for machinery, including a large tube rolling mill. Deliveries of both sand and chilled rolls continue to be made to many different iron, steel and other plants.

Lovegrove & Co., Incorporated, report a fair volume of business. The demand, however, is not as active as it was some weeks ago. Two engines, one 150 horse-power automatic, the other a 100 horse-power plain slide valve, have been shipped to parties in North Carolina, while orders have recently been received for a 22 x 44 x 48 inch compound Corliss engine and a 100 horse-power Corliss and two 100 horse-power boilers with patent balanced draft attachment.

Manning, Maxwell & Moore, through their local office, report a good demand for their various lines of machine tools. Inquiries continue good and contracts have been closed for a number of tools for general equipment of the Norfolk & Western shops, including lathes, heading machines, arch bar drills and other tools. They have also received a number of orders for tools from the Baldwin Locomotive Works of this city and from the Kutztown Foundry & Machine Company, Kutztown, Pa.

The Thos. H. Dallett Company notes an increased demand for pneumatic tools, particularly for stone working. Extensive sales of surfacing machines and plug and feather drills have been made. There is also a good foreign demand for portable drills, and some good business has been closed in this line for both foreign and domestic account.

The Link-Belt Engineering Company has closed a contract with the Weidman Silk Dyeing Company, Paterson, N. J., for a 10,000-ton coal storage plant and has numerous inquiries for other plants of the same kind, on which estimates are being prepared. It will also erect a coal handling system at the plant of the Babcock & Wilcox Company, Bayonne, N. J. Heavy shipments of cane handling machinery have been made to Cuba on orders previously noted, and its general business is said to be in a very satisfactory condition.

The American Pulley Company reports a very satisfactory increase in business. The demand has improved from nearly all sections of this country as well as from abroad. The New England and Southern States lead in point of domestic orders. Deliveries of pulleys have recently been made for export to London, Copenhagen, Geneva, Glasgow and South Australia, while domestic shipments include carload lots to Portland, Ore.; Montgomery, Ala.; the New England and Central Western States.

The Eynon-Evans Mfg. Company will erect 40 special oil furnaces in its foundry department. It is the company's intention to continue the use of crucibles for melting brass and bronze for castings, the furnaces being so designed as to avoid the contact of fuel and flame with the metal. In the blower department it has been continuously busy, and a number of steam jet blowers have been shipped to various steel plants. A special composite blower has also been designed for the Westinghouse Machine Company by which the uniformity of air and steam is maintained under varying conditions of volume, &c. In the pattern shop and in the machine shop the Eynon-Evans company keeps busy. It has had some good orders for large patterns, and the machine shop is occupied on a varied line of work.

Frank Toomey is erecting a plant containing a number of Manning boilers for the Luzerne Rubber Company, Trenton, N. J. In addition to this he is installing a boiler plant of two 150 horse-power Manning boilers for the Scranton, Dunmore & Moosic Lake Railroad Company and one 150 horse-power boiler for Crew, Levick & Co. A number of these boilers, 150 horse-power each at 135 pounds steam pressure, have recently been purchased by the above party, as has also the tool equipment of a large engine and machine shop, including a Detrick & Harvey open side planer, horizontal and vertical boring mills and a 7000-pound steam hammer, planers and other tools. Mr. Toomey has also just purchased one of the plants of the Eastern Forge Company, located in the New England States.

The Tabor Mfg. Company has had a very heavy demand for molding machines during the past few weeks. Inquiries have been very numerous and come from all sections of the country. Orders for five 12-inch and three 16-inch power ramming machines, one 32-inch power squeezer and five 13 x 18 inch split pattern machines have been received from parties in the Central West; ten 7-inch cylinder power ramming vibrator frame and six 16-inch power squeezers of vibrator frame type have been ordered by Brooklyn parties, and a 13 x 18 inch power ramming split pattern for valves and fittings has been sold a concern in New York City. Nine power ramming vibrator frame molding machines have been ordered by local parties, and a Pennsylvania concern has placed an order for a 20 x 48 inch duplex hand ramming machine for molding wash tray legs. Export demand keeps up fairly well; two machines, one a 30 x 30 inch, the other a 16 x 16 inch, have been ordered for foreign delivery. There is also a good demand for Taylor-Newbold saws; sales of several each of the 20, 30, 36 and 40 inch saws to various concerns are to be noted, as also several Taylor wet grinders for regrinding these saws.

The Newton Machine Tool Works reports a fair average run of business in all departments. Shipments are good, and inquiries in hand indicate a continuance of steady business for an indefinite period. Among the orders received during the past week are mentioned the following: A number of

special tools and heavy slab miller for the General Electric Company, vertical milling machines for the Missouri Pacific and Louisville & Nashville railroads, a cold saw cutting off machine and an 8-inch combined cutting off and boring machine for the Bethlehem Steel Company, the latter for use on armor plate nuts.

Cincinnati Machinery Market.

CINCINNATI, OHIO, June 20, 1905.

The larger portion of the shops of the machine tool trade present a very active appearance, and with an occasional exception have sufficient business booked to carry them through the summer months. A few of the plants, however, are reported to be somewhat short in orders received direct, but where this is the fact in most instances they are called upon to build tools for their more fortunate neighbors, who have more than they can conveniently handle. The fact becomes more apparent each year that tools made in this city are becoming famous for their workmanship and durability, and whereas we formerly followed, we now are in the very front ranks of the trade. During the week two representatives of the firm of Ludwig, Loewe & Co. of Berlin were here, endeavoring to secure agencies. We were unable to learn that they purchased any tools while in the city. We are advised by those who have apparently fully canvassed the situation as regards the foundry trade that quite a marked improvement is shown, and while there is nothing in sight that promises any great things, the general undercurrent has a brighter look than at any period since the molder's strike of a year ago. Foreign demand is a very important factor in the augmented trade of to-day and machine tool men are a unit in recognizing the fact that were it not for this phase of the situation conditions would be vastly different to-day from what they are.

Reports from the Industrial Bureau show that they are negotiating with a manufacturing concern now doing business in eastern Ohio, with a view to having it locate in this city. It now manufactures a vehicle brake, but should matters be so arranged as to secure the plant it will make a specialty of drop forgings. The company will be reorganized with a working capital of \$50,000. Local capital is being interested in the new proposition, and matters have progressed to such an extent that a report is expected during the week from a representative who has been sent to view the situation and make a detailed report.

The Cincinnati Planer Company has received an order for 30 planers of the larger sizes for export to Japan, England and France. In addition to this it has an order from Germany for six of its tools, which, by the way, is the first order that has come from this country for more than a year. General trade is said to be very satisfactory and a number of tools are on the floors for early delivery.

The G. A. Gray Company is having a fine run of both domestic and export business. During the week George A. Gray, founder of the present company, passed away at his home in this city. He was compelled to relinquish active service with the company during the past winter on account of ill health, and the company reorganized, electing as president, H. Marx; vice-president and treasurer, Adolph Zuest, and secretary, E. F. Cook.

The John Steptoe Shaper Company says that May was the largest month it has had for a year or more and that June is following very closely in the wake. Foreign trade is much better than at any time during the past year and is gradually growing better. Three shapers were sent to Japan this week via New York.

The Bradford Machine Tool Company reports no falling off in orders and that its order books are in good shape. Probably three-quarters of this trade is of foreign origin and well scattered over the countries of Europe.

The additional structure of the Cincinnati Milling Machine Company's plant has been delayed some by inability to procure material. This is seriously inconveniencing the company, as it is in great need of the added facilities in the way of floor space. It is crowded with work and is making strenuous efforts to make deliveries within the required time limit.

The Cincinnati Shaper Company reports a fair condition of trade, with possibly a slight falling off in orders in the last week. It has added a number of new tools and is now in a position to handle almost any volume of business that may come its way. The new pattern storage house is nearly completed and ready for occupancy.

In May the open hearth and Bessemer departments of the Homestead Steel Works of the Carnegie Steel Company turned out 176,500 gross tons of Bessemer and open hearth ingots. The Duquesne Steel Works of the same company made in May 98,000 gross tons of Bessemer and open hearth ingots, while the Donora Works turned out 33,300 gross tons of open hearth ingots.

PERSONAL.

John P. Shaddick, superintendent of the skelp mills of the Lorain Steel Company, Lorain, Ohio, has received a flattering offer from the Japanese Government of the position of superintendent of a large steel plant to be erected in Japan. Mr. Shaddick has not yet decided whether to accept the offer.

Chas. A. G. Winther, for many years general superintendent of the Chapman Valve Mfg. Company, Indian Orchard, Mass., has accepted a similar position with the Roe Stephens Mfg. Company, Detroit, Mich.

W. A. Jones of the W. A. Jones Foundry & Machine Company, Chicago, will make a summer trip to Alaska.

Talmadge Blass, for some time in charge of the coke operations of the Lackawanna Steel Company at Buffalo, has succeeded S. S. Hartranft as superintendent of the Lackawanna Iron & Steel Company, at Lebanon, Pa., having in charge the five furnaces in the Lebanon district and the by-product coke plant at Lebanon. T. C. Clarke, heretofore auditor at Lebanon, has been appointed assistant superintendent of the Lebanon district.

J. A. Rawlins of Naylor & Co., New York, returned from Europe this week.

At the meeting of the trustees of Lehigh University, held at South Bethlehem, Pa., last week, Henry Sturgis Drinker was elected president to succeed the late Dr. T. M. Drown. Mr. Drinker is a graduate of the university, class of 1871, and for years has been one of the trustees. Mr. Drinker began his professional career as a mining engineer with the Lehigh Valley Railroad and in 1872 was in charge of the construction of the Musconetcong Tunnel. Upon its completion Mr. Drinker spent two years in the preparation of his famous work on tunneling, a treatise unique to this day. During this time Mr. Drinker was also pursuing the study of the law and was admitted to the Philadelphia bar in 1876. Soon after he became counsel for the Lehigh Valley Railroad and the general solicitor for the company, serving in that capacity and as assistant to six successive presidents. With the late Eckley B. Coxe he was active in supporting Dr. Drown in the darkest days of adversity which befel Lehigh University, when the income from the investments in the stock of the Lehigh Valley Railroad failed it. In accepting the presidency Mr. Drinker is making personal sacrifices, but has the assurance of the enthusiastic support of both trustees and alumni.

John Finnerty, formerly superintendent at the Valley Works of the Republic Iron & Steel Company, Youngstown, Ohio, has been made general manager of the Cuyahoga Falls Bolt Works, Cuyahoga Falls, Ohio.

J. J. Spearman, one of the oldest iron manufacturers in the Shenango Valley and president of the First National Bank of Sharon, Pa., is critically ill and may not recover.

Frederick W. Sivyer, Milwaukee, Wis., president of the Northwestern Malleable Iron Company and also president of the local Merchants' and Manufacturers' Association, has returned from a three months' trip to Europe.

At the annual meeting of the Illinois Steel Company, held in Chicago, June 14, R. C. Campbell was elected a director to succeed C. H. McCullough, who has gone to the Lackawanna Steel Company. The other directors were re-elected and they in turn re-elected the old officers, the office of vice-president held by Mr. McCullough being left vacant.

Announcement is made of the appointment of deLancey Rankine to be third vice-president of the Niagara Falls Power Company and its allied companies, to succeed the late George W. Davenport. For seven years past deLancey Rankine has been secretary and treasurer of the Cataract Power and Conduit Company, Buffalo. He is also secretary-treasurer and general manager of the Tonawanda Power Company and of the Suburban Power Company. Mr. Rankine's new position makes him third vice-president of the Canadian Niagara Power Company.

Horace W. Fernald, who has been connected with the Tonawanda Iron & Steel Company, and later with the

Buffalo office of Rogers, Brown & Co., has been appointed resident manager at Boston of Rogers, Brown & Co. W. G. Moody retires as Boston manager on account of ill health.

Niven McConnell, who was recently elected vice-president and general manager of the Passaic Steel Company, Paterson, N. J., was on May 25 elected to the presidency of that company. He was associated for a number of years with the Carnegie Steel Company as superintendent of the open hearth steel department of the Homestead works. Afterward he built and managed the Sharon Steel Company's plant, which was absorbed by the United States Steel Corporation. He was then engaged by W. H. Donner, representing the Frick and Mellon interests in the Union Steel Works at Donora, Pa., also recently absorbed by the United States Steel Corporation. While he was general superintendent of the plant at Donora Mr. McConnell was engaged by the Passaic Steel Company.

Dr. R. W. Raymond, secretary of the American Institute of Mining Engineers, has been elected an honorary member of the Institution of Mining and Metallurgy.

At the recent meeting of the Associated Foundry Foremen, held in connection with the annual convention of the American Foundrymen's Association in New York, the list of vice-presidents was enlarged to include the presidents of the various local associations of foundry foremen. The list of these presidents follows, with the exception of that for Milwaukee, the election there taking place in July: Erie, Pa., W. F. Grunen, Erie City Iron Works; Chicago, Mr. Thompson, Link-Belt Machinery Company; Indianapolis, W. S. Keller, Wetherington & Berner Company; New York, Charles H. Thomas; Cleveland, A. L. Hott, Interstate Foundry Company; Philadelphia, A. T. William, Enterprise Mfg. Company; Hamilton, Ont., Frank Reid, D. Moore & Co.

The International Harvester Company, Chicago, has made several changes in departmental heads, as follows: Experimental department, M. Kane, general manager, to succeed R. B. Smith, and W. Cavanaugh, assistant manager. Security department, O. W. Jones, general manager, to succeed C. S. Funk. Traffic department, F. B. Montgomery, general manager, to succeed O. W. Jones. President's assistant, C. S. Funk.

Isaac W. Frank, president of the United Engineering & Foundry Company, Pittsburgh, sailed for Europe June 17, to be absent about three months.

N. P. Hyndman, general sales agent of Washington Coal & Coke Company, Pittsburgh, has gone to the Pacific Coast for an extended visit and will return about August 1.

W. A. Kingsley, president and general manager of the General Fire Proofing Company, Youngstown, Ohio, has resigned, to take effect July 1.

It is stated that Myron C. Wick, Youngstown, Ohio, will be elected a director of the Republic Iron & Steel Company, to succeed Peter L. Kimberly, deceased.

George R. Wadsworth has resigned his position of resident engineer on the New York Central Railroad to accept a position on the staff of J. G. White & Co., New York, as assistant to the construction superintendent.

Trade Publications.

Locomotive Cranes.—Browning Engineering Company, Cleveland, Ohio. Bulletins 9 to 17. No. 9 deals with an automatic grab bucket of an improved clam shell type for handling crushed limestone and granulated slag. Photographs show the bucket just commencing to dig, in its open and closed positions, and the parts of the bucket operating mechanism. No. 10 pertains to locomotive cranes for steam power plants. One view shows a No. 3 locomotive crane handling coal at a radius of 65 feet at the Hudson Portland Cement Company, Hudson, N. Y., and another a No. 2 crane on a trestle, supplying coal for a boiler house. Several diagrams show systems of coal handling by locomotive cranes for steam power plants. No. 11 concerns locomotive cranes in the lumber industry. No. 12 is confined to the No. 3 locomotive crane, giving a general description of it, its dimensions, capacity and numerous views of the parts of its mechanism and the crane at work. In one of the latter it is handling 20 tons at the radius of 10 feet. No. 13 similarly describes the No. 2 locomotive crane. At a radius of 10 feet

this machine has a lifting capacity of 15 tons. No. 14 similarly describes the No. 1 locomotive crane, which has a capacity of 12 tons at a radius of 12 feet. No. 15 shows the mechanism of the coil spring friction clutch, which is used for the principal power transmissions in the locomotive cranes and bucket handling electric trolleys made by the Browning Company. No. 17 shows the Browning square type automatic grab bucket, particularly designed for digging coal, ashes, cinder, coke, gravel, sand, crushed stone, slag and materials of a similar character.

Graphite.—Joseph Dixon Crucible Company, Jersey City, N. J. Six leaflets. These are being distributed to those interested in marine engineering, dealers in ship chandlery and supplies. The value of flake rather than crystalline graphite for all lubricating purposes is referred to in one circular. The others concern graphite pipe joint compound for steam and gas pipes, flanges, gaskets, &c.; flake graphite for pipe fitting; flake graphite as a lubricant for steam cylinders; the value of flake graphite as a general lubricant in marine engine lubrication, and the possibility of improving grease lubrication by adding flake graphite.

Gasoline Engines.—Waterous Engine Works Company, St. Paul, Minn. Catalogue D-3; size, 6½ x 10 inches; pages, 32. Describes the Waterous gasoline engine, for use in grain elevators, railroad pumping stations, water works plants, electric stations, printing offices, farm work and general power purposes. Illustrations are given of the two sides of the engine and the engine as applied to the gear driving of pumps and deep well pumping engines and in portable form on wheels. The reading matter describes the general principles of the engine operation, the working of the vaporizer or mixer and igniter and the gasoline pumping engines and deep well working heads. Tables give dimensions and prices of the seven sizes in which the engine is made, ranging from 5 to 25 horse-power. Useful information on barometric pressure at different altitudes and conversion tables are appended. An interesting gasoline fine engine for village fire protection is shown on the last page.

Water Tube Boilers.—E. Keeler Company, Williamsport, Pa. Illustrated catalogue; size, 6 x 9 inches; pages, 72. Devoted to the Keeler water tube boiler and containing many illustrations showing the setting of the boiler, its outside appearance, its internal construction, course of the flue gases in different forms of the boiler and details of the parts entering into its construction. The text deals with the factors which effect the selection of a boiler and give in detail a description of the construction. The boilers are built in standard units of 75 to 675 horse-power, based on 10 square feet of heating surface per horse-power. The latter part contains description of the workmanship, support and setting, use of superheated steam, the Metteser superheater, the use of lignite and bagasse as fuels. This is interspersed with views of installations of the Keeler boiler and details of the Metteser superheater. Self supporting steel stacks are shown in the back part of the catalogue. Tables are appended of the stack dimensions required for given horse-powers of boilers, factors of equivalent evaporation and condensed tables of the properties of saturated steam.

Gasoline Engines.—Stamford Motor Company, Stamford, Conn. Card. Briefly refers to the Sneeker motor, made in double and four cylinder form for marine and stationary work, in sizes from 2 to 7 horse-power.

Tool Steels.—Peter A. Frasse, 92 Fulton street, New York City. Price-list of Poldi tool steel. Contains valuable data on the main points necessary in tool steels and facts about the working of tool steel, such as cutting bar steel, heating steel to forge, forging, hardening, tempering and grinding and allowance in sizes of steel for machined tools. Description is given of the various grades of Poldi extra quality, special quality, special x quality, extra special very hard, self hardening and diamond high speed steel. Directions for working are given and a list of the sizes and shapes carried in stock.

Boilers and Engines.—The C. H. Dutton Company, Kalamazoo, Mich. Fifteenth annual catalogue. Emphasis is laid in this catalogue on the claim that the company manufactures only one grade, the best. Instead of having "a," "b" and "c" grades, as is sometimes done, the position taken being that the manufacture of anything but a first-class boiler is criminal, and that the sale of anything but a first-class engine, no matter what the price, is not honest with the customer. The leading position in the catalogue is given to the Jewel automatic steam engines, which are equipped with the Rites governor. A line of vertical and horizontal engines with throttling governors is also described and displayed. Attention is called to the fact that every engine made by the firm is placed on the test block and run at full pressure and without a load, and that all Jewels are subjected to the careful brake water test.

Blake Condensers.—The W. H. Blake Steam Pump Company, Hyde Park, Mass. Catalogue No. 25, illustrating jet surface condensers. These range in size from a horizontal jet condenser of 600 pounds capacity in steam condensed per hour up to one of 26,100 pounds; while the twin simple and compound air pumps and jet condensers range in capacity from 8700 pounds of steam condensed per hour to 135,000 pounds. Measured by the same standard, the surface condensers with air and circulating pumps are built in sizes ranging from 4100 to 40,000 pounds capacity.

HARDWARE.

THE matter of special brands, which is engaging the attention of many prominent Hardware merchants and manufacturers at the present time and is likely to be a subject of general discussion in the trade, evidently has two sides to it and involves a definite conflict of interest between the two great classes immediately concerned. That it is an important and almost vital matter to manufacturers who care to make a reputation for themselves and their goods goes without saying, and it is not to be wondered at that manufacturers who are anxious to have their name and brand accepted as a guarantee of quality and their trademark thus of value are determined to resist the encroachment of the special brand system, which among other injuries tends to deprive them of this laudable incentive. With the method which prevails so largely manufacturers may be making good goods, but get no credit for them from those who use them, or even from the merchants through whom they are distributed.

On the other hand, it is only just to remember that it is to the jobbers' interest to sell special brands if the manufacturers are willing to make them. They have, indeed, with some jobbers an important place and contribute not a little to their prestige and success. The fact that in the great majority of cases jobbers' special brands are of lower quality than the manufacturers' best brands permits them to be sold at an exceptionally good profit. Whether, however, the goods bearing the jobbers' private brands are of high, medium or low grade it is unquestionably to the advantage of the jobbers to have brands of goods which they control, of which they can make a specialty, and which can be obtained only through them. If they succeed in getting from the manufacturers goods of high quality, whether purchased at a high or a low price, they may establish a reputation for their brands which will have commercial value. If, on the other hand, they are less careful about the quality of the goods they may market them at a better profit than would be realized from the handling of manufacturers' brands, into the sale of which competition enters with more or less cutting of prices. In any case they have in their own private brands a specialty which they control, which they can press upon the attention of their customers and which, identified with their names, can be made an important feature of their business. There are some considerations on the other side, and obvious advantages to the jobber in selling the manufacturers' brands, but it must in frankness be admitted that many of the jobbers are interested as things are at present in the maintenance of special brands. Their interests in this matter are directly opposed to the manufacturers'. So far as this is the case what one loses the other gains.

In this view of the problem, if altruistic rather than business principles prevailed, both the manufacturers and the jobbers might be willing to sacrifice their own advantage for the sake of others. As things are, however, under the laws which govern business, it is to be expected that the manufacturers will strenuously endeavor to correct existing conditions and tendencies. That they have been so indifferent in the matter and so slow to take action for their own defense requires a more resolute effort and entails a harder struggle. The special brand business has become so well established that its unreasonableness and mischievousness are not fully recognized by the trade or the public, and the owners of these special

brands are naturally and quite properly determined to hold the advantage they possess. With this conflict of interest there must, in the nature of the case, be strife between the two parties, a contest of resource and strength, in which both manufacturers and jobbers will do their best in promoting their own interests. There are already indications of the coming of an open struggle in this matter. Those who are familiar with what is going on below the surface are aware that both manufacturers and jobbers are getting ready for the conflict. If either side fancies that the other is going to quietly submit the mistake will soon be discovered. The manufacturers perhaps more than the jobbers need to be reminded that the effort in the line both of defense and aggression is not all to be on one side. It is simply business for those who make the special brands and those who own and market them to take measures which will be for their advantage in this matter. The contest is inevitable. While it will be conducted seriously and strenuously, as a grave matter especially for the manufacturers, we bespeak the continuance of good feeling and reasonableness in the consideration of the subject in all its phases.

Condition of Trade.

The volume of business is moderate, as few merchants are at the present time buying beyond their requirements. This is in part because of the advance of the season and the near approach of the turn of the year, when there is generally a halting in business enterprise with the larger merchants and manufacturers. The market, too, is regarded as in an interesting condition, hesitating between strength and weakness, with an inclination to yield slightly to the pressure toward lower values in goods which are directly affected by the price of iron. While there is certainly some irregularity in the prices of heavy goods values are generally quite steady, though in some cases apparently maintained by the control of pools or associations or the determination on the part of manufacturers not to yield to what may be only a temporary condition. The spirit of competition, however, among the manufacturers is shown in the earnest pursuit of business and the shading here and there of quotations. Of this, however, there is not a great deal in connection with General and Miscellaneous Hardware, and the market is on the whole well maintained. More irregularity in prices in general is produced by the cutting on the part of the jobbers, many of whom have considerable stocks on hand and are making concessions with more freedom than usual. It is probable, too, that the catalogue house competition has something to do with this state of affairs, inasmuch as it is recognized that retail merchants must as far as possible be enabled to purchase goods at figures which will put them in a position to compete with their mail order competitors. It should, however, be noted that in connection with the irregularities thus referred to there is a continuance of activity and prosperity throughout the country generally, with promise of good crops, so far as can be judged at this time, and various reasons for taking a hopeful view of the future of business.

Chicago.

Hardware interests in general are highly satisfied with the volume and general character of business that is coming to them. Jobbers speak in terms of praise of the promptness with which manufacturers are as a rule making shipments, although there are some cases where factories are almost swamped by the unusual volume of

business enjoyed, as, for instance, in Lawn Mowers, Haying Tools, Screen Doors and the better class of Refrigerators. Prices on Wire products, including Nails, are quite well maintained by the mills, but the jobbers are not quite so firm in their offers to retail merchants, some having surplus stocks that they are offering at concessions. The recent hot, dry weather has started the sale of Garden Hose and is helping the Pipe and the Wind Mill business, industries that have suffered materially by the prolonged wet weather of the last two or three months. Builders' Hardware is extremely active, particularly locally, and here, too, there is some difficulty in securing some classes of goods from manufacturers. Up to three weeks ago country business was larger in proportion than city business, but since June 1 the city business has been picking up noticeably and country business is running along on an even keel. Merchants in the country need have no fear in sending their orders to Chicago manufacturers or jobbers for delivery, as the Chicago interests are taking care of all business that comes their way and are snapping promptly in spite of the teamsters' strike. This statement is made for the purpose of offsetting false reports that are in circulation.

NOTES ON PRICES.

Wire Nails.—The conditions which have characterized the market for some time are substantially unchanged. Jobbers are meeting with good demand, encouraged to some extent by concessions in price. Some of the mills are also offering inducements to accelerate sales. Mills report a restricted demand, on account of large stocks in jobbers' hands. The larger mills are maintaining official prices. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads to jobbers.....	\$1.80
Carloads to retailers.....	1.85

As we go to press a number of manufacturers are conferring at Chicago in regard to the situation, but it is not thought likely that any change will be made in existing prices.

New York.—Demand keeps up well, especially from nearby points which are tributary to this city. From present indications some jobbers anticipate that their output this month will exceed that of May. The local market remains firm and prices are unchanged, as follows: Single carloads, \$1.99; small lots from store, \$2.05.

Chicago, by Telegraph.—Prices quoted by the leading producer and by large representative independent mills are unchanged, on the basis of \$1.95 in car lots to jobbers, \$2 in car lots to retailers, with 5 cents advance for less than car lots from mill.

Pittsburgh.—Mills report only a fair demand for Wire Nails, while some of the jobbers state that the warm weather of the past two weeks has accelerated demand to considerable extent and that their stocks of Wire Nails are now moving out more freely than for some time. Jobbers, in order to move their stocks more freely, are making concessions in prices, and this is also being done by some of the small outside mills. We quote Wire Nails at \$1.80 in carloads to jobbers and \$1.85 to single carload buyers, actual freight from Pittsburgh to destination being added, but in some cases these prices are shaded.

Cut Nails.—Mills continue to keep production down to the actual requirements of the trade, which is only fair. Quotations are as follows: Carload lots, \$1.80; less than carload lots to jobbers, \$1.85, and to retailers, \$1.95, f.o.b. Pittsburgh. Iron Cut Nails, for delivery at Pittsburgh, Buffalo and all points west of these cities, 10 cents advance per keg on Cut Steel Nails.

New York.—No change has taken place in market conditions, and demand continues about the same as for some time. New York quotations are as follows: Carloads on dock, \$1.94; less than carloads on dock, \$1.99; small lots from store, \$1.90 to \$2.

Chicago, by Telegraph.—The prices quoted to railroads and large merchants range from \$1.80 to \$1.90, Chicago, on Steel or Scrap Iron Nails, while the smaller interests will be quoted from \$1.90 to \$2, according to

size of prospective order. Store prices range from \$2 to \$2.05, base.

Pittsburgh.—Demand is only fair and the mills continue to restrict output to meet actual tonnage wanted. The outlook is that the Cut Nail trade will be quiet for some little time yet. We quote Cut Nails at \$1.70 to \$1.75, base, in carload lots, f.o.b. maker's mill, the lower price being absolute minimum of the market. For Iron Cut Nails an advance of 5 to 10 cents a keg is charged over above prices.

Barb Wire.—The stocks in jobbers' hands are still too large to require replenishing from the mills to any great extent. Concessions in price are being made by jobbers to reduce stocks, this being done by some of the mills. Quotations are unchanged as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$1.95	\$2.25
Retailers, carload lots.....	2.00	2.30
Retailers, less than carload lots.....	2.10	2.40

Chicago, by Telegraph.—We quote the following official prices: Painted Wire, \$2.10; Galvanized, \$2.40; car lots to retailers, 5 cents higher; less than car lots, Painted Wire, \$2.25; Galvanized, \$2.55; Staples, Bright, in car lots to jobbers, \$2.05; Galvanized, \$2.35; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—A moderate amount of new business is being placed with the mills, but the jobbers are trying to move out their large stocks more freely by making slight concessions in prices. This is also being done by some of the mills that are badly in need of orders. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carloads.....	\$1.95	\$2.25
Retailers, carloads.....	2.00	2.30
Retailers, less than carload lots.....	2.10	2.40

Smooth Fence Wire.—Similar conditions to those prevailing in the Barb Wire market are prominent in the market for Smooth Fence Wire. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.65
Retailers, carloads.....	1.70

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12 & 12½	13	14	15	16
Annealed...Base	\$.05	.10	.15	.25	.35	.45	.55	
Galvanized...\$0.30	.35	.40	.45	.55	.65	1.05	1.15	

Chicago, by Telegraph.—The market is rather steadier than usual at this time of year in that prices are maintained more evenly than might be expected from decreasing cost of raw materials and the fact that we are between seasons. Official prices are as follows, on the basis of \$1.80 for Annealed, car lots to jobbers, and \$1.85 in car lots to retailers, with 5 cents advance for less than car lots and 30 cents premium over Annealed for Galvanized.

Pittsburgh.—There is a fair demand for Field Fencing and the trade this year in this product has been quite satisfactory. Jobbers are shading prices to some extent in the endeavor to move out their stocks more freely, and some of the mills are retaliating by also making concessions. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.65
Retailers, carloads.....	1.70

Binder Twine.—Reports indicate that the schedule of prices is being adhered to by comparatively few sellers, and that considerable carried over Twine is being offered. No quotations of less than 9 cents for Sisal or Standard have been reported, and this price is regarded as exceptional. Buying is of a conservative character, merchants apparently waiting until they can learn about what their requirements will be. The accompanying quotations will serve as a guide to purchasers:

Sisal	9½ to 10 c.
Standard	9½ to 10 c.
Standard Manila (550 feet).....	11c.
Manila (600 feet).....	12 to 12½c.
Pure Manila (650 feet).....	13½c.

Five-ton lots, $\frac{1}{2}$ cent less; carload lots, $\frac{1}{4}$ cent less, Chicago delivery, usual terms of payment. Kansas City, Omaha, Council Bluffs and Minneapolis, $\frac{1}{4}$ cent added. Prices not guaranteed. Allowing for freight, New York prices would be $\frac{1}{4}$ cent lower than the above.

Rope.—Buyers are confining their purchases to actual requirements and business consequently lacks the snap desired by manufacturers. Present conditions of the fiber market offer no special inducement to buyers to buy Rope in large quantities. The market has not yet regained its full strength regarding prices, which show some irregularity. General quotations, on the basis of 7-16-inch diameter and larger, are as follows: Pure Manila, 11 $\frac{1}{2}$ to 12 cents; Pure Sisal, 10 cents; No. 2 quality Sisal, 8 to 8 $\frac{1}{4}$ cents per pound.

Window Glass.—At a meeting of Window Glass manufacturers held last week at Columbus, Ohio, at which about 850 pots were represented, the question of reducing the cost of producing Glass was discussed, and a special Wage Scale Committee was appointed. There is some talk of a reduction in wages of from 15 to 25 per cent. from this year's scale, to enable manufacturers to compete with machine made Glass. Demand from factory has been fair and while no change has been made in quotations, there appears to be a tendency toward stiffer prices in some quarters. Local jobbers report a continued light demand. New York quotations are 90 and 10 per cent. discount on all sizes, single and double, with the exception of the first two brackets of single strength B. which are 90 and 20 per cent. discount. The exception is made to meet the price of machine made Glass.

Oils.—*Linseed Oil.*—The bulk of business is for small lots for immediate delivery. Crushers, in most instances, are not offering for forward shipment beyond the end of the month, and demand for carload lots is limited. The market is strong at unchanged prices. Quotations are as follows: City Raw, 50 to 51 cents per gallon, according to quantity; State and Western Raw, 48 to 49 cents.

Spirits Turpentine.—The market is firm at a decrease from last week's quotations, on advices from the South. Demand is for small lots in the local market. New York quotations, according to quantity, are as follows: Oil barrels, 61 $\frac{1}{2}$ to 62 cents; machine made barrels, 62 to 62 $\frac{1}{2}$ cents per gallon.

Axes.—A meeting of the Axe Association was held in this city yesterday, when the announced advance of 25 cents to go into effect July 1 was confirmed. This will make the price of Single Bit Axes, base weights, \$6.75 per dozen, and Double Bit Axes, \$8.75 per dozen. It is also intimated that a further advance of 25 cents is likely to be made October 1, but whether the trade will be influenced in their buying by this intimation will depend on their view of the situation, and especially of the competition which may come into the field.

PRODUCTION OF WIRE AND CUT NAILS.

FROM the annual statistical report of the American Iron and Steel Association we obtain the particulars given below in regard to the production of Wire and Cut Nails in 1904, as compared with recent years. It will be observed that the output of Wire Nails for the past year shows a substantial increase over former years.

Production of Wire Nails.

The production of wire nails in the United States in 1904 amounted to 11,926,661 kegs of 100 pounds, as compared with 9,631,661 kegs in 1903, an increase of 2,295,000 kegs. The following table gives the production of wire nails by States in 1902, 1903 and 1904, in kegs of 100 pounds:

States.—Kegs of 100 pounds.	1902.	1903.	1904.
New Hamp., Mass., R. I. and Connecticut	309,651	230,264	247,157
N. Y., N. J., Pennsylvania and Ohio	7,202,814	6,497,788	7,616,745
Md., West Virginia, Ky. and Alabama	401,562	200,318	377,280
Indiana and Illinois.....	2,902,006	2,367,820	3,033,756
Mich., Wis., Colorado and Cal..	166,213	335,471	651,723
Totals.....	10,982,246	9,631,661	11,926,661

The wire nails produced in 1904 were all made of steel, and were turned out by 56 works, as compared

with 57 in 1903, 62 in 1902, 61 in 1901, 56 in 1900 and 59 in 1899. For 1903 it was necessary to estimate the production of two wire nail plants and for 1904 to estimate the production of one plant. The maximum production of wire nails was reached in 1904.

Production of Cut Nails.

The statistics of the production of iron and steel cut nails and cut spikes embrace only standard sizes of nails and spikes cut from plates. They do not embrace railroad and other forged spikes, wire nails of any size, machine made horseshoe nails, cut tacks, or hob, clout, basket, shoe, or other small sizes of nails. The production of cut nails and spikes cut from plates in 1904 was 1,283,362 kegs of 100 pounds each, against 1,435,893 kegs in 1903, a decrease of 152,531 kegs. In 1886 the maximum production of 8,160,973 kegs was reached. In 1904 the production of wire nails exceeded that of cut nails by 10,643,299 kegs, in 1903 by 8,195,768 kegs, in 1902 by 9,348,484 kegs, in 1901 by 8,261,582 kegs, in 1900 by 5,660,485 kegs, in 1899 by 5,713,790 kegs, and in 1898 by 5,846,254 kegs.

Eleven States made cut nails in 1904 and 11 in 1903. The following table gives the production of iron and steel cut nails by States from 1901 to 1904, in kegs of 100 pounds. The wire nail production is added to the table. Except West Virginia and Kentucky all the States which produced cut nails in 1904 decreased their production as compared with 1903. Of the total production of cut nails in 1904 about 887,675 kegs were made from steel plates and about 395,687 kegs from iron plates.

States.—Kegs.	1901.	1902.	1903.	1904.
Pennsylvania	833,469	752,729	725,000	698,326
Ohio	123,788	99,938	59,240	54,038
W. Va. and Indiana	150,222	271,362	274,808	245,997
Mass. and N. J.	179,474	167,963	143,898	128,943
Ill., Md., Va. and Ky.	240,657	304,990	223,447	148,058
Wis., Col. and Cal.	14,630	36,780	9,500	8,000
Total cut nails... .	1,542,240	1,633,762	1,435,893	1,283,362
Total wire nails... .	9,803,822	10,982,246	9,631,661	11,926,661
Grand totals.... .	11,346,062	12,616,008	11,067,554	13,210,023

TUTHILL SPRING COMPANY'S NEW PLANT.

THE TUTHILL SPRING COMPANY has lately occupied its new quarters in the heart of Chicago. Owing to the geographical arrangement of the city, the same cause which has operated to confine the so-called shopping district to a few blocks on State street makes it desirable for any manufacturer doing a retail business to be near the center, so as to be easily reached from each of the three divisions of the city. Finding the time had come to secure a permanent location, free from the risks incident to leased property, the company selected a piece of vacant land on West Polk street, lying 100 feet east of Halsted street. As the latter is the one long street which runs straight through the city from north to south it affords convenient access by transfers from every part. A one-story brick building, with roof at lowest point 15 feet high, was then built, having 196 feet frontage on north side of West Polk street, and running 119 feet deep. Behind this an extension, 25 x 80 feet, gives space for machine shop and engine room, and opens upon a yard for storage accessible from Mather street.

The works are so arranged that the raw steel is teamed into the building at the east end of the Polk street front and thrown into bins convenient to be cut. From the shears the stock goes to the heading machine, to the eye makers and to the other machines along the east side of the building. It then moves to the west wall, where the plates of the springs are tempered and fitted under the bright light of the high western windows. The springs go then to the grinders, who use stones 12 to 15 inch face and 6 to 7 feet diameter. From the grinders the springs are taken by the finishers, who in turn lay them in the shipping room. Here they are loaded upon the teams, which can back in from Polk street.

The Clifford Harness business at Ashtabula, Ohio, has been purchased by the Crosby Hardware Company, which will also handle a complete line of Hardware, Stoves, Paints, Sporting Goods and Electrical Supplies, wholesale and retail.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM DAVIS HARDWARE COMPANY, Fort Scott, Kan., in which the interest of C. C. Crain has been bought by Robert Armstrong. The lines covered include Paints and Sporting Goods, in addition to Shelf and Heavy Hardware, Stoves, Tinware, &c.

FROM JULIAN HARDWARE & IMPLEMENT COMPANY, Julian, Neb., which has bought the retail business of D. H. Stout.

FROM C. MARCHETTI & SON, who have opened a Hardware store and Tin shop at Beaver Meadow, Pa.

FROM STUART G. SPEIR & SON, 123 Wall street, Schenectady, N. Y., who have embarked in the retail business in Shelf Hardware, Agricultural Implements, Paints, Oils, &c.

FROM WILSON HARDWARE COMPANY, Bartlett, Texas, which will commence the retail Hardware, Furniture and Vehicle business about August 1.

FROM H. F. PINNEY, New Albany, Kan., who has purchased the general Hardware business of R. T. Minton.

FROM LAING HARDWARE COMPANY, Osawatomie, Kan., which has recently engaged in the Shelf Hardware, Stove, Implement and Plumbing business.

FROM SCHEBLE BROS. HARDWARE COMPANY, Wenatchee, Wash., which has bought out the Shelf and Heavy Hardware, Stove, Paint, Implement, Sporting Goods, Plumbing and Steam Fitting business of Perkins & Homer.

FROM AKRON HARDWARE SUPPLY COMPANY, Akron, Ohio, which has bought out the Hardware department of Inman Bros.' business and will occupy a new block built especially for the purpose. In addition to Hardware, Stoves and Tinware, Paints, Sporting Goods and Explosives will be carried.

FROM LUVERNE REPAIR COMPANY, Luverne, Minn., E. M. Becker, proprietor, which will handle Shelf and Heavy Hardware, Stoves, Paints and Sporting Goods, taking over the business of C. W. Grant.

FROM CHETEK HARDWARE COMPANY, Chetek, Wis., C. E. and T. J. Zeisinger, proprietors, which will deal in Shelf Goods, Stoves and Tinware, Paints and Sporting Goods.

FROM SCHMIDT & SANDOZ, who have succeeded Jos. K. Schmidt in the Hardware and Implement business at Verdigris, Neb.

FROM THE PATERSON-THOMPSON COMPANY, J. E. Paterson and M. M. Thompson, Niagara Falls, N. Y., which has recently been organized to carry on a general Hardware, Stove and House Furnishing business.

FROM OSCEOLA HARDWARE & SUPPLY COMPANY, Osceola Mills, Pa., which especially requests printed matter relating to mining supplies, Tinware and Enameled Ware.

FROM H. M. RICE, Oconee, Ark., who has purchased the Hardware stock formerly carried by J. W. Rice, his father.

FROM TRAGLE & ESCHBACH, Camden, N. J., who have just opened up a shop for the manufacture of Sheet Metal Cornice Work, Skylights, Fire Doors, Ventilators and Sheet Metal Work of every description, and who will be glad to receive catalogues and discount sheets per-

taining to the sheet metal trade. Mr. Tragle for the past five years has been connected with the Metallic Mfg. Company as foreman draftsman and pattern cutter.

RALPH H. PLUMB.

RALPH H. PLUMB, president of the Buffalo Bolt Company, died of heart failure last week. He was born in Gowanda, N. Y., September 20, 1845, and was a brother of the late Fayette R. Plumb of Philadelphia. Mr. Plumb had been identified with the manufacture of Bolts and Nuts of various kinds since 1866, when the firm was Bell & Plumb. In 1869 O. C. Burdick was taken in, the firm becoming Plumb & Burdick. In 1871, the title became Plumb, Burdick & Barnard, and in 1897 the Buffalo Bolt Company, as at present, Mr. Plumb becoming president of the company at that time. Mr. Plumb possessed a most charming personality, was unusually liked and respected and was a leading citizen of Buffalo. He was president of the Fine Arts Academy, a director in the Erie County Savings Bank and had been president of the Buffalo Club. He is survived by one son, Ralph Plumb, who will succeed him in the Bolt business, his wife having died a year and a half ago.

ILLINOIS RETAIL HARDWARE ASSOCIATION'S NEW DEPARTURE.

THE ILLINOIS RETAIL HARDWARE ASSOCIATION has decided to hold its next annual convention in the First Regiment Armory, Chicago, February 20, 21 and 22. The association has rented the entire armory and will sublet space to exhibitors on the basis of \$25 for each 10 x 12 foot space during the life of the convention, a price that is very much lower than is ordinarily charged by hotels. Exhibitors can have possession of space from the day before to the day after the convention, inclusive. Admission tickets will be printed and sold to jobbing houses and supply firms and an admission of 25 cents will be charged to the general public. The building will be illuminated and will be open evenings as well as during the day, a military band furnishing music during the afternoons and evenings. L. D. Nish of Elgin is secretary of the Illinois Association.

AMONG THE HARDWARE TRADE.

Powell Hardware Company, St. Cloud, Minn., has been incorporated, with a capital of \$25,000, to do a retail business in Shelf and Heavy Hardware, Stoves, Tinware and Sporting Goods.

Rau & Ball have bought the Hardware business formerly conducted in Canon City, Col., by Landon & Reynolds.

Holloway & Weber have succeeded Pearl & Weber in the Hardware business at Brownsville, Ore., adding a line of furniture, carpets, &c.

Kremer & Wolf Bros., Hardware dealers, Worthington, Iowa, have been succeeded by Kremer & Wolf.

F. I. Baker, formerly of St. Cloud, Minn., has opened a retail store in Sauk Rapids, Minn., handling Shelf and Heavy Hardware, Stoves, Paints and Sporting Goods.

Wilson, Nuss & Co. have recently started a new Hardware business in Hoisington, Kan.

Fire in the store of Williams Bros., Pocahontas, Ark., on the 5th inst. damaged the stock to the extent of \$10,000, with \$5000 insurance.

S. R. Anstein has purchased the Hardware business of A. D. Seybolt, Tamora, Neb.

Fire in the Trachte & Grahman Farm Implement warehouse at Johnson Creek, Wis., June 12, spread to the Hardware store of the firm and damaged the building and contents to the extent of \$4000.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us duplicate copies of catalogues, price-lists, &c., one copy for our Catalogue Department in New York and another for our London office; and at the same time to call our attention to any new goods or additions to their lines, of which appropriate mention will be made besides the brief reference to the catalogue or price-list in this column.

IVER JOHNSON'S ARMS & CYCLE WORKS, Fitchburg, Mass., New York office 99 Chambers street: Illustrated catalogue relating to Revolvers, Revolver Grip and Single Guns.

W. C. HELLER & Co., Montclair, N. J.: Circular of Steel Hardware Shelf Boxes and Sample Holder.

MASSACHUSETTS TOOL COMPANY, Greenfield, Mass.: Illustrated catalogue and price-list No. 4 relating to Instruments of Precision and Accuracy for Machinists' Use.

LAWSON MFG. COMPANY, 40 Dearborn street, Chicago, Ill., New York office 107 Chambers street: Illustrated pamphlets showing Double Acting Floor Spring Hinge and Automatic Burglar Proof Window Ventilating Lock.

JONES OF BINGHAMTON, Binghamton, N. Y.: Circular illustrating the Retailer Portable Platform and Family Union Scales.

JULIAN SCHOLL & Co., 126 Liberty street, New York: Illustrated pamphlet relating to the Universal Road Rollers.

THE CHAMPION IRON COMPANY, Kenton, Ohio: Printed matter illustrating Fences, Gates, Structural and Ornamental Iron Work, Jail Work, Lawn Furniture, &c.

INTERNATIONAL MFG. COMPANY, 1408 Wabash avenue, Chicago, Ill.: Circular illustrating Mann's Holdfast Screw Driver.

THE EASTERN GRANITE ROOFING COMPANY, Irving Building, New York: Illustrated catalogue relating to the merits of Perfected Granite Roofing. Views are given of a large number of buildings covered with the Roofing.

THE HUMPHREYS MFG. COMPANY, Mansfield, Ohio: Illustrated circulars showing Model Double Acting Force Pump and Compound Air Spray Pump and Coating Machine.

P. C. NIELSON, 451-453 Pearl street, New York: Net cash price-list No. 5 devoted to Wheelwrights', Blacksmiths' and Horse Shoers' Supplies, Carriage Makers' and Trimmers' Tools and Findings.

THE LISK MFG. COMPANY, Canandaigua, N. Y.: Small catalogue and cook book in which attention is called to the company's Enameled Steel Ware.

SAMUEL HARRIS & Co., 23-25 South Clinton street, Chicago, Ill.: Illustrated price-list of Tools and Supplies; also goods of the company's manufacture, including Hack Saws, Thumb Screws and Nuts, Wrenches, malleable iron Ladles, small Engine Castings and Governor Castings.

THE SUCCESS PAINT COMPANY, Providence, R. I.: Booklet relating to Success Paint, designed for use on all kinds of metal and wood.

FLINT & WALLING MFG. COMPANY, Kendallville, Ind.: Folder devoted to Wind Mills, Steel Towers, Wood and Steel Tanks, Pumps, Hydrants, Pipe and Fittings.

NIAGARA FALLS METAL STAMPING WORKS, Niagara Falls, N. Y.: Catalogue and price-list No. 4 relating to Hardware Specialties, Steel Stamps, Letters and Figures, Embossing Dies, Seal Presses, Sheet metal Signs for all purposes, &c.

THE BELCHER & TAYLOR AGRICULTURAL TOOL COMPANY, Chicopee Falls, Mass.: Catalogue No. 23 illustrating, with prices, Plows, Harrows, Weeders, Cultivators, Rollers, Fertilizer Sowers, Corn Planters, Feed Cutters, &c.

THE MEYERCORD COMPANY, Chicago, Ill.: Printed matter relating to Decalcomania Transfer Ornaments and Signs. These covers a large variety of styles and are adapted to a multitude of purposes, advertising and otherwise.

TRADE ITEMS.

GEORGE T. BOOTH, managing director of Booth, McDonald & Co., Christ Church, New Zealand, arrived in New York the latter part of last week from Great Britain. He expects to stay in New York about a week and then visit some places of special interest in the United States, including Niagara Falls, Yellowstone Park and the Lewis and Clark Exposition in Portland, Ore. He will then return to New York, later sailing for England, where Mrs. Booth awaits his return.

A. R. PRITCHARD, founder, treasurer and general manager of the Rochester Stamping Company, Rochester, N. Y., announces that he has severed his connection with that corporation to associate himself with the Pritchard-Strong Company of the same city. He will have supervision of the technical details surrounding the Pritchard-Strong Company's products, which include Lanterns, Hardware Specialties and a varied line of practical sheet metal House Furnishing Goods of high quality. Mr. Pritchard's experience of nearly a score of years in this line should be of much value to the new company.

THE WRIGHT WIRE COMPANY, Worcester, Mass., has opened a warehouse at 97 Fremont street, San Francisco, Cal., where a complete line of Wire Rope and the other products of the company will be carried in stock for the Pacific Coast trade. William J. Barrett, formerly with the San Francisco office of the John A. Roebling's Sons Company, Trenton, N. J., will be in charge of the branch.

BENJ. P. FORBES, 74 Frankfort street, Cleveland, Ohio, having bought out the Glasbrite Company, manufacturer of Glasbrite, a chemical window cleaner for factory use, will be pleased to mail a free sample of this article to factories on application.

H. F. BRAMMER MFG. COMPANY, Davenport, Iowa, issues a circular showing the various electrotypes which the company is prepared to furnish free to merchants for use in their local papers in calling attention to the fact that they have the O. K. Washing Machines for sale. The company is now using considerable advertising space in farming publications throughout the country, in which the readers are urged to "see the O. K. at your local dealer's store."

CHARLES F. BELTZ has lately opened an office at 314 Fourth avenue, Pittsburgh, as manufacturers' agent for Pittsburgh and western Pennsylvania in Harness, Leather Goods, Automobile Supplies, Bicycles, Belting and Packing, Rubber Goods, &c. Mr. Beltz has had 14 years' experience in these lines and is open for a few more accounts on commission.

WILLIAM VOGEL & BROTHERS, Brooklyn, N. Y., are working rapidly in the direction of putting their plant in better shape than before the recent fire. Their power plant was not seriously damaged and they expect within a few days to resume operations.

NORTH BROS. MFG. COMPANY, Philadelphia, has recently issued a circular in which attention is called to electrotypes for advertising, which the company is ready to furnish gratis to merchants for use in their local papers. On some lines, as, for instance, the company's new American Twin Freezer, to which the above circular particularly relates, special advertising electros have been prepared which are identical with those used by the company in its magazine advertising to consumers, providing a place for the merchant to insert simply his name and address. Other merchants desire electros showing the goods only, preferring to prepare their own text, and for this class the company have cuts of several sizes from which the Hardwareman can make selection.

FELTON, SIBLEY & Co., 136 South Fourth street, Philadelphia, are sending out to the trade sample cards calling attention to their Non-Corrosive Priming and Finishing Paint, which is especially adapted for engines, machinery, &c. This Paint is referred to as being entirely free from acid and as not corroding or rusting the iron on which it is used. Another card calls attention to their line of Machinery Enamel for use on engines, tools and all kinds of machinery. Reference is made to the economy, easy working and quick drying properties of this Enamel, eight different shades of which are shown on the card, special shades being made to order.

SIMMONS HARDWARE COMPANY'S BOOK OF TESTIMONIALS.

SIMMONS HARDWARE COMPANY, St. Louis, Mo., has recently issued a very unique, elegant and interesting volume of testimonials, in which some 750 letters are presented from as many merchants throughout the country referring to the good qualities of the company's Keen Kutter products and the satisfactory profit secured from their sale. The frontispiece of the book is a portrait of the founder of the business, Edward C. Simmons, which is followed by a letter from him to the trade. Interspersed through the book are illustrations of the various tools, including Saws, Hatchets, Chisels, Auger Bits, Files, Drawing Knives, &c., as well as Pocket Cutlery, which are made and sold under the brand Keen Kutter. The illustrations are exceptionally fine and artistically executed. Among other pictures is one of a Hand Saw in its perfect shape and condition, while in the same connection there are illustrations of Saws that have been used from 10 to 20 years, and though narrowed down by repeated sharpening, are still doing excellent service.

The company has apparently gotten out this book to combat the idea that standard brands of goods are more desirable for the retail trade than special brands. The testimonial letters included in the book have all been received by the company during the last 12 months, and in distributing the books they have been sent only to those merchants whose letters appear. Many of these houses, we are advised, find the book useful in helping them to sell goods of the better grades at larger profits, and the company believes that the book properly used by the retail dealer will be of material assistance in the sale of goods, as the customer can hardly fail to be impressed with the quality where so much testimony is supplied in regard to it.

One of the special features of the book is the fact that the company has reproduced the letter heads of its customers in *fac-simile*, giving variety and interest to the book. In many cases the merchants refer to the excellent profits made on the goods, and the fact that they warrant the goods constantly and in the strongest terms possible, with no complaints of dissatisfaction.

Another purpose of the book, however, was to give the customers of this house a weapon with which to fight catalogue house competition. It could hardly fail, if properly shown, to enlist the attention of prospective purchasers to the merits of these goods, and they would probably hesitate before sending to the catalogue houses when they could find at home goods that were so highly recommended and so largely indorsed.

Near the end of the book is an illustration in colors of the company's World's Fair exhibit at St. Louis, the opposite page giving a complete description of the component parts of the display. Earlier in the volume is an impressive view of the various warehouses and stores of the company, indicating effectively the extent and completeness of the facilities of this great Hardware house, of whose enterprise and aggressiveness the volume in hand is a striking illustration.

THE UNITED STATES STEEL MAT COMPANY, formerly located at 413-415 West Broadway, New York City, has removed to Middletown, Conn., in the factory formerly occupied by the Liberty Chuck & Wrench Company, and is installing machinery, &c. The company is making extensive improvements and alterations in the plant and expects to commence active operations about July 1. It will continue to manufacture Rigid and Rolling Steel Mats, Rubber Block Rolling Mats, &c., and will also engage in the building of Gasoline and Kerosene Engines, both stationary and marine. In the new Kerosene Engine it is stated that there will be many new and radical departures in construction. Later the company will probably put out some specialties the nature of which is not yet disclosed. C. Frank Doebler, the president, will have the general management of the business.

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NEW ORLEANS NOTES.

(FROM A SPECIAL CORRESPONDENT.)

JUST now Builders' Hardware, Building Hardware, Indoor Fittings and Furnishings, &c., are leading all other lines in the local and city trade, and in the trade that is going out to other towns and cities round about New Orleans. The building boom that seemed at its crest six weeks ago has gone even higher, and the volume of the local business in New Orleans surpasses even what was anticipated, with the heaviest contracts yet to be let. The work now being done is the construction and fitting of small houses, homes, &c., for rent or owners' occupancy.

The population of the city is increasing at an unprecedented rate, and of course this adds to the demand. There are nearly 8000 artisans in the city now, who have been brought here to do the work that is on. These men are keeping the stores busy, and with the native workmen are all good customers.

In the lines thus affected the volume is ahead of last season. This is of course the dead season for mill supplies. The timber lands in Mississippi and Louisiana are being opened rapidly, and the Goodyear Syndicate is building new roads and new mills, but this does not make up for the complete stoppage of the gin houses and the sugar mills, &c.

Implements have fallen behind one year ago, this despite the fact that the farmers in the cotton belt bought heavily just prior to planting time. The expected demand for the implements commonly used for hay, corn and general feed stuff handling has not set in, chiefly because heavy rains in the entire section prevented the planting of these feed stuff crops and also choked off much of the projected cotton planting. The sugar planters are still buying, but have purchased almost up to the saturation point.

Ship Chandlery is better than last year, because the harbor fleet is considerably larger. Mill and Machinery Supplies are being bought to a considerable degree by roads that are doing heavy construction work. General Hardware runs very evenly to all markets.

New Domestic and Foreign Markets.

This week a group of local firms, headed by Stauffer, Eshleman & Co., will put the steamship Iris into the West Florida trade, thus making two steamships a fortnight into the territory of Cedar Keys, Key West, and Tampa, that was formerly completely controlled by the lines out of New York or the Southern cities of the Atlantic Coast. The Louisville & Nashville road out of New Orleans did not give the proper arrangements and seemed to favor the other end, hence one steamer was put into the trade and immediately prospered. Now the second one is ready with a full cargo awaiting her maiden voyage. This is in line with the Texas Coast steamships that have cut heavily into the Dallas and the St. Louis trade on the coast down toward Mexico.

Directly connected with this is the recent stride made into Cuban territory through the advantages of the Munson line recently established into ports other than Havana in Cuba. The first jobbing consignments of Hardware went this week to Matanzas and Cardenas on the north shore and to Cienfuegos and thence to Santa Clara on the south coast. Before the Munson line began running the rail rates from Havana to these points rendered the New Yorkers, through their direct steamship connections, able to completely sew up the island trade. Now the market is open for New Orleans, and the big firms of the city are taking immediate and full advantage of it. Thus far the shipments have been chiefly in Building Hardware and Mill Supplies. Some small lots of Machinery and Farm Implements have gone to sugar plantations.

With the promised coming in of another East and West line across Louisiana and touching practically virgin territory hitherto available for either St. Louis or Dallas, New Orleans hopes to extend to the West. With two new North and South roads promised it is believed that rate competition will extend trade to the North. There has been renewed talk of the establishment of a

large line down from Pittsburgh to bring great shipments of manufactured goods to New Orleans for distribution to the immediate South and to foreign markets. There is said to be a tentative plan for the erection of a great warehouse system here. This same project was taken up by Implement manufacturers of Illinois about a year ago, and resulted in nothing more than better rates for them from the railroads. No one will say that this new project is any more substantial.

That Panama Squabble.

It is practically agreed now that New Orleans has not obtained the share of Hardware business, heavy or general, that should have fallen to her. There is a dispute as to the cause of this. At a dinner given recently by the Heavy Hardware Association of the city, it was frankly announced that the methods of handling such goods here, and of meeting competition in them, were antiquated, and that until some radical and drastic changes were made the city could not hope to compete with the great centers of the East and North. It was frankly declared that the efforts of the Board of Trade to obtain guarantees of better treatment from the Panama Canal Commission had failed of their purpose, and that New Orleans was still "getting left." It was said that more vigorous action should be taken. This dinner was given just after it became generally known in New Orleans that the city had obtained little if any of the great letting on May 15 to 20.

News of the attack came to the ears of the Board of Trade. On its special Panama committee were: Col. B. F. Eshleman, head of the Hardware house of Stauffer, Eshleman & Co., and Pearl Wight, head of the firm of Woodward, Wight & Co. Both came to the rescue of the committee and pointed out that much had to be done, and that it could not all be accomplished in a day. It was pointed out that some contracts had been obtained here and that there were chances for more. However, the Heavy Hardwaremen are still aggrieved over the situation.

NICOLS, DEAN & GREGG'S FIFTIETH ANNIVERSARY.

NICOLS, DEAN & GREGG, St. Paul, Minn., wholesale merchants in Heavy Hardware, have just celebrated the fiftieth anniversary of the establishment of their business. An interesting and condensed history of the house for the half century just elapsed has been published in the form of a 16-page booklet, which also presents illustrations of their various stores and portraits of the different members composing the firm from the organization of the business to the present time. The firm, originally Nicols & Berkey, has been successively Nicols & Dean, Nicols, Dean & Co., again Nicols & Dean, and Nicols, Dean & Gregg, as now. Some of the partners have served in the State Senate and House of Representatives, and at various times as members of the City Council and on several city and county boards, also holding positions of responsibility in national affairs.

CHESWICK MFG. COMPANY is now operating its new works at Canton, Ohio, where it has purchased the plant which was built for the Structural Steel Car Company. This is an entirely new building and the main shop is over 500 feet long by 76 feet wide. The company has in the neighborhood of 25 acres of ground, with separate office buildings and engine and boiler houses. The plant will be operated by independent motors for each machine. The company will turn out a line of Skillets, Fry Pans, Spiders, Griddles and Trip Gongs. In addition it will manufacture Agricultural Specialties, such as Harrow Disks, Rolling Coulters, Pressed Steel Seats and special shapes of Open Hearth Steel. C. Metterhausen, 56 Fifth avenue, Chicago, has recently been appointed general sales agent for the company. Mr. Metterhausen is also secretary and treasurer of the Wallace Supply Company.

INLAND EMPIRE IMPLEMENT AND HARDWARE DEALERS' ASSOCIATION.

THE first semiannual or summer convention of the Inland Empire Implement and Hardware Dealers' Association, which was organized in February last, was held in Spokane, Wash., on the 7th and 8th inst. The sessions were held in the Moorish room of the Hotel Spokane and were well attended, nearly 100 members being present. The meeting was a decided success in every respect, and the interest manifested promises well for the future of the association. On the forenoon of the 7th the Board of Directors held a meeting to arrange the preliminaries, and facilitate the work of the convention.

President Butterfield's Address.

The convention was called to order Wednesday afternoon, C. L. Butterfield of Moscow, Idaho, president, making the following address:

In convening for our first semiannual meeting I trust that it is as great a pleasure for you to be here as it is for me to welcome you. We have met at this time with a view to carrying forward the work which we began last February, that of building up an association whose influence for good will be confined not wholly to our territory, but a broader field. If we can but extend our sphere of influence to assist in the bringing about of reforms in the world of commerce which are now being tried by various organizations we will be doing for the betterment of our country as well as for ourselves.

REGULATING FREIGHT RATES, ETC.

There is a body of men who are without compensation spending weeks and months of time trying to create favorable sentiment among the people, and especially among members of commerce, toward having the interstate commerce law amended so that the commission will have power, in a manner, to regulate rates. We of the far West are well aware of the necessity of such action if we are to be relieved of rates, rules and conditions of transportation that are unreasonable and wholly unfair. A convention was held in St. Louis last October styled the Interstate Commerce Law Convention, and through its work and through the work of the men interested therein is due much of the popular sentiment for increased powers for the commission, which subject has received not only President Roosevelt's support, but his earnest wish that such legislation be enacted, and it is one of the subjects that will probably be taken up at the special session of Congress to be convened in the fall.

I speak of this to show the necessity of organizations interesting themselves in such matters, to point out their obligations to men who are working for our interests and to ask that as an association we give them the best assistance we can.

WATERWAY FROM LEWISTON TO THE COAST.

Another example of the effectiveness and general good which comes by agitation and the application of energy is the progress which has been made toward obtaining a transportation waterway from Lewiston, Idaho, to the Pacific Coast. The completion of the Portage Railroad at Celilo Falls indicates that it is now possible to transport freight from Lewiston to Portland other than by rail. With the completion of the locks at the Falls and considerable dredging below Riparia, we will have river navigation that will bring freight rates down on commodities both going out from and coming into this entire section—something we all desire. Our association can do much toward bringing influence to bear for State and national assistance in putting the river in navigable condition at an early date, and the stronger we are in numbers the greater will be our influence.

ELIMINATING ABUSES.

While we are correcting and adjusting our modes of business to conditions now existing, so that we can obtain a fair return on our investment, we can in a general way be a potent force for good within our two States. It is our duty while here to consider the conditions which are arising with a tendency to cut down profits to a point where business cannot pay a reasonable return, or possibly survive a tightening in money markets. Those

conditions should be exposed and remedied as far as lies in our power. I have no doubt that every merchant in this room can instantly bring to mind a half dozen or more things that should be eliminated from present conditions. There are but few here who have sufficient capital to run their Hardware or Implement business and at the same time be banker for the rural community. There are others who, if they possess the money, do not care to tie up such a volume of capital. In the matter of extending credits and giving time, all of you realize that, even in the years of good yields and fair prices, from the amount of paper you now carry, not only owing to its being past due, but also to the fact that it was taken on twelve months' or longer time, you, at this time of the year, if not earlier in the season, have to go to the bank for accommodations. Surely the prudent way is to make such difference between cash and time as to induce the purchaser to borrow at the bank to his gain in the transaction rather than from you to carry him and later have to borrow at the bank yourself.

BANKS THE MONEY EXCHANGES.

This is simply directing business in its proper channels, for banks are by right the money exchanges. If in years of prosperity you are compelled to borrow, owing to the customers' notes you are now carrying, what will be the outcome when a season of small crops with fair prices or good crops with small prices, or both small crops and small prices occur?

Your Committee of Arrangements has provided a programme which I trust will be the pleasure of every person present to participate in enthusiastically. Let us proceed to the work before us, determined to do it so well that those dealers who are not represented will wish that they were, and through our good work and efforts by January next we may have our membership doubled and benefits directly felt.

Report of Secretary Evenson.

E. W. Evenson, Spokane, followed with a report as secretary, in which he reviewed the work of the association since its organization. The membership had doubled and the financial condition was of the best, all bills being paid and there being a nice balance in the treasury.

Membership had been solicited by mail from every eligible dealer in the territory embraced by the association. He spoke of the advisability of affiliation with the National Retail Hardware Association and recommended that steps be taken in that direction.

CATALOGUE HOUSE BUSINESS.

In doing so he called attention to the magnificent work being done through the National Association in an effort to control the catalogue house problem. He said that dealers in the Inland Empire were not very generally aware of the magnitude of the business done by catalogue houses in their territory. He showed that one town alone had sent about \$23,000 to large Eastern catalogue houses during 1904. These figures were obtained from a friendly postmaster, who, at the solicitation of the secretary, had kept track of the money order business in this line during 1904. It averaged \$75 for every business day in the year ending April 1, 1905.

He also called attention to the fact that some dealers who were not members of the association were trying to make capital out of the fact that they were not members, by statements to their trade that the association was in the nature of a trust, and was organized to boost prices. Also that the association was trying to force such dealers into joining through pressure brought by jobbers and manufacturers. Hence, it was that such dealers posed as martyrs before the buying public, and were trying to get business through such influences.

AMENDMENTS TO THE BY-LAWS.

To cover such cases the secretary recommended the adoption of the following amendment to the by-laws: "No rules, regulations or by-laws shall be adopted in any manner stifling competition, restraining trade or pooling profits." The secretary also moved the adoption of an amendment which shall admit traveling men and

traveling freight solicitors to honorary membership at \$2 per year. These amendments were adopted.

E. E. Plough of Wilbur, Wash., then entertained the gathering with a poem entitled "The Implement Man," in which some of the qualifications and tribulations of the merchant in this line were set forth.

Paper by D. F. Anderson.

At the Wednesday evening session D. F. Anderson of Rosalia, Wash., read a paper entitled "A Business and a Profit, and How They Are Related," in part, as follows:

A mercantile business must be conducted on a business principle to be successful. Now, what is that business principle? When I was a young man and made my first business venture, an old man, who was a friend of my family and who had spent his life in the mercantile line, said: "The first thing with you is to be sure in buying your goods to know that you are buying them from right parties and at such prices that you can sell them at a good, fair profit and compete with your brother merchants. Buy only standard goods, those you can recommend and guarantee, and at all times stand under and make your guarantee good. Make your assortment complete for the demands of your locality. Also be very careful not to overstock, as old goods usually color, damage from rust, &c."

I have never forgotten this and believe it has done me a lot of good during my years of business, and I believe it is the best of advice to any young man engaging in a business. But we do not stop there. The first principle required in a good salesman is to know his goods, to know the cost and selling price, and this can only be done by having the cost and selling prices plainly marked on each article. The quality of your goods can only be known by carefully studying and constantly watching what you are selling, and always advise your customers of the true facts as you know them.

KEEP YOUR STOCK WELL ARRANGED

and in such shape that it can be shown quickly and to the best advantage. The old saying is that "Time is money," and it is true, and it is also a fact that most of your best customers are active and busy men and do not want to be delayed when they come to your store to trade; they prefer to get what they want quickly, and a good salesman will at all times study his customer and his needs and requirements and be able to know as nearly as possible just what will please him. By doing this the salesman will reduce his work very much and please his patron.

PERCENTAGE OF PROFIT.

Profits should always be fair; the cost of the article and the rapidity of sale should be considered always in figuring out a margin. That is to say, an article occasionally called for should bear a greater margin than a staple article. But all should bear a fair margin. When I say a fair margin I do not mean, as a merchant once told me when talking to him about profits, that he looked at an article and his first thought was what does my competitor get for this; or if my competitor does not have it how much can I get for it; what will it sell for and bring me the greatest profit and still sell; but I mean a profit that will reimburse me for my investment, rentals, cost of insurance, clerk hire and such other expenses as a merchant usually has in running a business. We must count our subscriptions to the various things required in the town, such as celebrations, baseball, fairs, charity, &c. This must be added to expense and the balance sheet must show a profit over and above all these expenses, so that we can add to our capital each and every year.

PAINSTAKING INVENTORY.

How shall a merchant determine his profits? This can only be done by a careful inventory each year. The invoice should be taken with the same care as if he was buying the stock, a careful balancing of his books and charging to profit and loss all doubtful accounts. Then after deducting all liabilities he can know what is left. Many guess at their stock and hold on their books accounts for years that should not be there, and in this way the balance shown by their books is misleading. We do not make a profit by trying to induce or influence our competitors' customers to come our way by cutting prices. We do not make a profit or gain trade by abusing our competitor or denouncing his goods as being inferior. It is enough for us to advocate the best qualities and points of our own wares.

Business and profit must have a close relation. The business produces the offspring; profit and the offspring must support the parent; the one cannot long survive without the other.

Mutual Fire Insurance.

Mr. Anderson's paper was followed by a general discussion of the subject, after which A. I. Porter, secre-

tary of the Western Lumberman's Association, addressed the meeting on mutual fire insurance. Mr. Porter presented a mass of facts and figures, which when boiled down indicated that when the profit was taken out of insurance it didn't cost much. The remainder of the evening session was taken up with a discussion of this topic, many of the members expressing themselves in favor of forming a company, and quite a number putting themselves on record as willing to insure with it.

REPORT OF INSURANCE COMMITTEE.

Mutual insurance was again taken up on Thursday morning. W. P. Lucas, Davenport, Wash., of the Insurance Committee, read an exhaustive report, showing that Mutual Fire Insurance associations, correctly organized, and rightly safeguarded, were capable of protecting the insured, and at the same time effecting a great saving over board rates. This saving would prove an inducement in getting new members and holding the old ones and making the organization stronger. The committee recommended the formation of the Inland Empire Implement and Hardware Dealers' Mutual Fire Insurance Association under the laws of Washington, to be strictly a mutual company confined to members of the association. Policies to run for one year, and to be limited to \$3000 for any one risk, and not to exceed one risk in each block. The plan outlined was that where two or more risks were taken in one block the proposed company should reinsure the risks in excess of \$3000 in an Eastern mutual company, and that no member shall be liable for an amount in excess of his annual premium. The report went into all the details, the plan of organization, such as rates, meetings of policyholders, election of trustees and officers, filling vacancies, duties of officers, assessments, dividends, reserve funds, &c.

TO ORGANIZE A COMPANY.

After a little discussion the report was unanimously adopted, and Mr. Lucas moved that the chair appont a committee of five to take charge of the affairs of the proposed company and complete its organization. This motion prevailed, and the president appointed the following Committee on Insurance: W. P. Lucas, chairman; J. R. Stevenson, A. B. Salmon, F. H. Hilliard and E. W. Evenson.

Joining the National Association.

The matter of joining the National Retail Hardware Association then came up for discussion, and it was unanimously decided to affiliate with the National Association. The dues of \$1 a year are to be collected by a special assessment of \$1 from each member.

"The Man Up the Street."

J. H. Berge of Davenport, Wash., who was to have read a paper on "The Man Up the Street," was unable to be present at the meeting, and sent a facetious letter to the secretary, from which we make the following extracts:

You asked me to write about "The Man Up the Street." Well, he's there yet. He may not be as handsome as you and I are, nor as aesthetic in his tastes. He may not appear as well in society as we do and not use that polished Missouri language for which we are so noted. Neither may he be able to make the public believe that he is worth ten times more than he really is, like you and I can, but if he is treated half way like a white man should be treated, he is the best friend you and I have and will make more actual money for us than any customer we have.

I fully realize that I am entitled to all of the Hardware and Machinery business there is in this town, but there are a large number of dumbheads that think differently, and therefor I must adjust myself to their opinions if I want to continue in business at the old stand. But then this desire to

POSSESS EVERYTHING IN SIGHT

and \$10 more is a part of the genuine American's nature by birth, and therefor we must all be taught, sooner or later, that there are others. And how it does jar our refined and superior natures to learn that we are no better than the common herd. Yes, it is very humiliating to be compelled to admit that our competitor has rights equal to our own, but financially it is to our interest to make him at least believe that we think that he is. It is wonderful how intelligent you find your competitor is and how actually accommodating he is if you treat him

with ordinary consideration. This Old World is pretty large, and there is room for all, if we possess just what is intended for each of us, but if you throw a rock in your neighbor's backyard he will more than likely throw back two.

THE GOLDEN RULE

we consider all right, if our competitor puts it into practice, but to begin the process at home is a horse of another color. Do you remember those days long gone by when the white down just began to start on your upper lip? How you stood before the glass, pulled it to make it grow faster, and admired those classic features? How you pitied that poor homely cuss across the street for being so ugly, and then went out among them that night confident that the prettiest girl there would be ours for the asking? It was then that we found that she really preferred that homely kid. That was the first lesson in coming in contact with competitors, and you went home the wiser for the experience; after that you were not the only pebble on the beach. The same is true in business life. As soon as we realize that we are very little, if any, smarter than other people, and are not entitled to any more consideration, we will have advanced to a plane where the emoluments will be more to our liking, and all jars with that measly competitor will be at an end, for we will find that he is just as anxious to do right as we are, and very often a little more so.

An Enjoyable Banquet.

The convention formally adjourned at noon Thursday. In the evening an elaborate banquet was very much enjoyed. There were three long tables, beautifully decorated, at which about 175 persons sat down. F. H. Mason of Holley, Mason, Marks Hardware Company acted as toastmaster. The speakers and their topics were as follows: "Our Successful Association," by President C. L. Butterfield; "Maintaining Prices," by E. M. Brannick, Studebaker Bros. Mfg. Company, Portland, Ore.; "The Power of the Press and the Power of the Association," by T. M. Shearman of the *Implement and Vehicle Record*, San Francisco; "The Age Limit," by George A. Davis of the Pacific Steel & Wire Company; "What I Know About Gas Engines," F. H. Shaw of Shaw-Wells Company; "The Inter-Pacific Northwest, or, What is Known as The Inland Empire," by State Senator Reiter of Davenport; "Pictures of the Inland Empire, by I. C. Hattabaugh of Grangeville, Idaho; "Some Beauties of the Long Distance Telephone," by J. D. Chickering of Holley, Mason, Marks Hardware Company. The banquet closed with a selection by the Elks' Quartet.

HISTORY OF THE BOLT AND NUT INDUSTRY

"**H**ISTORY of the Bolt and Nut Industry of America" is the title of an interesting and comprehensive volume pertaining to this important branch of manufacture recently issued. The author is W. R. Wilbur of Cleveland, Ohio, by whom the book is dedicated to Isaac P. Lamson, president of the Lamson & Sessions Company of Cleveland, whose desire that the annals of the Bolt and Nut industry in this country should be carefully collected and preserved was the chief motive that inspired the publication of the book. Acknowledgment is also made of the assistance generously given in the compilation by many prominently identified with the business. The book contains more than 400 pages, and is bound in stiff covers with leather backs and corners. It is embellished with 51 illustrations, principally portraits of the leaders and pioneers in the industry. The frontispiece is a view of the first Bolt factory in America, that of Rugg & Barnes, Marion, Conn., which business was established in 1840, the plant being 20 x 30 feet in dimensions. The book closes with a general summary giving briefly in chronological order the various important developments of the business, such as issuance of patents, new machinery, standardization of threads, &c., a list of manufacturers in this field being also given. The volume is an exceedingly creditable one, and is a valuable contribution to the literature of this branch of the trade.

THE eleventh annual picnic of the Chicago Retail Hardware Association will be held in Alton Park, Wednesday, July 19. The usual round of gayety will prevail, including games, dancing, target shooting, &c. The picnic is in charge of committees, of whom the following are

chairmen: Arrangements, A. J. Englehardt; Transportation, J. L. Smith; Dancing, George Bartholdy; Sports, G. A. Englehardt; Target Shooting, H. E. Gnadt; Refreshments, G. R. Lott; Prizes, W. H. Bennett.

MISCELLANEOUS NOTES.

Bullard Automatic Wrenches.

Bullard Automatic Wrench Company, Providence, R. I., is adding two new sizes to the line of Bullard wrenches—namely, Nos. 0 and 4, one smaller and the other larger than the present sizes made. No. 4 will take up to 2½-inch pipe, and No. 0 is for ¾-inch pipe. The new sizes will be ready for shipment about July 1.

The Putnam Spring Clothes Pin.

C. C. Putnam & Son, Putnamville, Vt., for many years engaged in the lumber business, have recently begun the manufacture of the Putnam spring clothes pin. Among other features possessed by their product the manufacturers particularly refer to the following: That the pin will hold clothes on a wire line as well as on a manila line; that as the spring is galvanized it will not rust or smut the clothes; that the woods will not break, split or tear clothes; that the pin will not freeze on the line, and that the spring is made of a comparatively larger size of wire than others, insuring a stiffer and firmer spring.

Hopkins & Allen Arms Company.

The Hopkins & Allen Arms Company, Norwich, Conn., has made a very desirable change in the sighting of its Junior rifles. They are now made with Rocky Mountain step rear sights and sporting front sight. This rifle can also be supplied with a full octagon barrel. The .22 caliber is chambered for .22 short, long and long rifle cartridges; the .32 caliber for .32 short or long rim fire cartridges. A steadily increasing demand for these rifles is noted.

The New Universal Square.

The combination square shown in the accompanying cuts is being introduced by the Duby & Shinn Mfg. Company, 19 Park Place and 16 Murray street, New York. The device comprises a true square, a true miter and a true various pitch-cut scale. The square is used as a

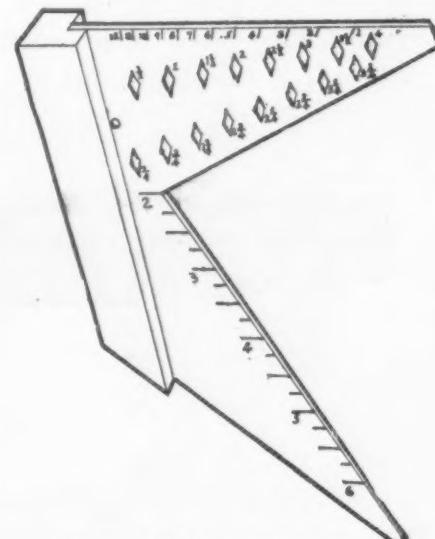


Fig. 1.—The New Universal Square.

lumber gauge; for marking mortises and tenons, octagons and hexagons; for drawing circles; as a try square and straight edge—all these without any adjustment. The larger sizes have the complete rule scale in addition to the markings shown in Fig. 1. The operations with the square are accomplished by a reversal of the tool from one side to the other, as, for instance, in ruling pitch cuts, then reversing it to mark hip and valley cuts. The

markings on the tool are $\frac{1}{8}$ inch on one side and $\frac{1}{4}$ inch on the other side. It is made in 6, 10 and 13 inch sizes,

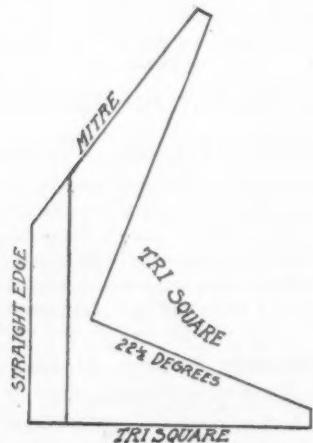


Fig. 2.—Uses of Different Edges.

of the best grade of steel, oxidized or nickel finish. The square is designed for use by carpenters, cabinet makers,

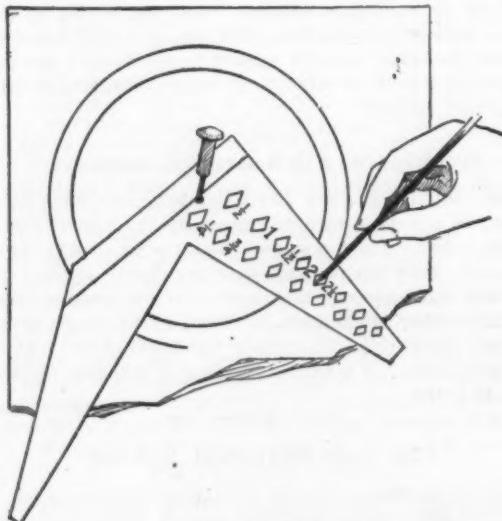


Fig. 3.—Drawing Circles.

draughtsmen, pattern makers, machinists, iron workers, farmers, &c.

Galvanized Sheet Metal Step Ladder.

The metal step ladder illustrated herewith is manufactured by the Chandler & Art Brass Works of Richmond, Ind., which refers to it as combining lightness with a high

and rear of the stiles, so as to make the construction perfectly rigid. The step braces are made of wrought iron, $\frac{1}{8} \times \frac{3}{8}$ inch, half oval. The back supports are of No. 22 galvanized iron, 1 inch in diameter, and are joined with the stiles by means of malleable castings. Connecting the back supports with the stiles is a wrought iron brace, $\frac{1}{8} \times \frac{3}{8}$ inch, attached to sliding galvanized loops on the supports for folding. When the ladder is in position this brace is slightly below the center, making it impossible for the ladder to spread or the brace to be thrown out of



Galvanized Sheet Metal Step Ladder.

position in shifting the ladder from place to place. It is claimed that any ladder will support a weight of over 1 ton, and that as all the metal is galvanized and the wrought iron parts are japanned there is no danger of rust nor likelihood of weakness resulting from use or age. It is also stated that the ladder stands true and rigid, and therefore can be used with greater safety and convenience than wooden steps. Sizes offered run from 4 to 10 feet.

Union Single Trigger Double Barreled Hammerless Shotguns.

The Union Firearms Company, Toledo, Ohio, has just brought out the Union single trigger double barreled hammerless shotgun here illustrated. Some of the structural features to which attention is drawn are as follows: That the sportsman always shoots with same length of stock, distance from butt to trigger does not change, no mixing of triggers and more room for a gloved finger in cold weather. The single trigger action has been patented by C. F. Lefever. It can be changed from left to right, and vice versa, by the shifter, which



Union Single Trigger Double Barreled Hammerless Shotgun.

degree of strength and durability. Its stiles are made of No. 24 galvanized sheet metal in one piece, with the center rib pressed together so as to make a double thickness. Increased strength is also afforded by doubled edges, which are free from roughness or danger of cutting. The steps are made in the same manner of No. 22 galvanized iron, with ends passing out and in through a slot, turned over on the inside and riveted to the front

is placed in the natural position for operating. The hammers come back to original position when the gun is opened. Barrels can be furnished in steel twist or Damascus, 12 gauge only. The stocks, of black walnut, can be any length or drop. The locks have spiral springs and all parts are tempered. All outer parts are handsomely case hardened and the taper is bolted to take up wear.

Lisk's Self Basting Roaster.

Lisk Mfg. Company, Canandaigua, N. Y., is introducing the stamped seamless enamel roasting pan shown in



Lisk's Self Basting Roaster.

the accompanying illustration. It is made in four sizes, to take from 6 to 20 pound roasts, and is warranted for ten years.

Double Hammer Gun.

The W. H. Davenport Firearms Company, Norwich, Conn., which for years has made a large variety of single guns and about two years ago added a line of double guns, having built up quite a business with its double

hard usage and are below the line of sight. The barrels are made detachable by the use of the company's patent metal joint and patent flush leaf screw key joint pin, whereby the fore end remains fixed to the barrels when removed and will not become loose from continued use. This gun is simple and strong in construction, the parts are easily removed for cleaning or repair and can be re-mounted without difficulty even by a novice. The principal dimensions are: Length of stock, 14 inches; drop of stock, 2 $\frac{1}{2}$ to 3 $\frac{1}{2}$ inches; weight, 7 $\frac{1}{4}$ to 7 $\frac{3}{4}$ pounds; 12 gauge, 28 to 30 and 32 inch barrels. The barrels are choke bored, plain blued steel and bored for either nitro or black powder. They have a finely matted flat top rib, American walnut pistol grip stock and fore end; rubber butt plate and top snap action. The company states that this is a thoroughly well made, serviceable gun at a moderate price.

Balanced Ball Bearing Washing Machines.

The two washing machines illustrated herewith are the same in all particulars except the finish, the Winner being painted and varnished, while the tub of the Leader is clear wood and is finished in natural wood. The tubs are made from white cedar, the frames, hoops and trimmings being finished with aluminum bronze. All iron coming in contact with the water is heavily coated with tin to prevent rust. The frame which carries the weight of the tub and clothes and upon which comes all the rack and strain, is made of steel tubing, one continuous piece



Double Hammer Gun.

hammerless guns, is now putting on the market a new line called the double hammer gun, as illustrated herewith. This gun, the manufacturer states, has been designed to meet all the requirements of strength for use of standard loads of nitro powder, stand hard usage and not shoot loose. The steel breech with which the barrels are reinforced is made of one piece of forged steel, in-

of which is bent into proper shape to form two legs. Two of these pieces are crossed and bolted through the center to the tub in such a way as to tie them all together, while a continuous rod is threaded through each leg, all being designed to make a frame that is practically indestructible. The weight of the tub and clothes is carried upon steel ball bearings incased in hardened steel ball races to insure easy running and durability. In use the tub is rotated forward and backward against a



Fig. 1.—Winner Balanced Ball Bearing Washer.

cluding the lug, which is recessed into the bottom of the frame to form a recoil shoulder, keep the barrels always tight at the breech and relieve the strain on the joint pin, while the extended rib provides for side strain. The parts, which are made of steel, are interchangeable and the lock work is all machined. The hammers, mounted within the frame, are well protected from damage by

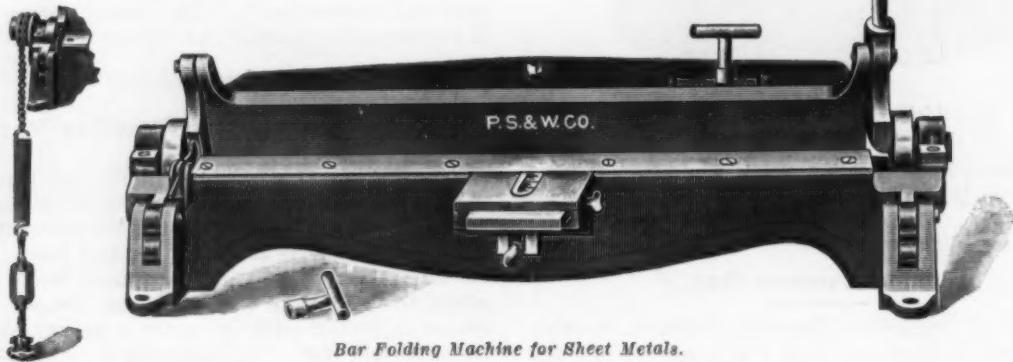


Fig. 2.—Leader Balanced Ball Bearing Washer.

heavy automatic spring, which does the greater part of the work. The washing is done by combined rubbing and throwing of water through the fibers of the clothes. It is stated that with these machines lace curtains as well as the coarsest fabrics can be washed without injury or the use of a washboard. These machines are offered by the Standard Mfg. Company, Shelby, Ohio.

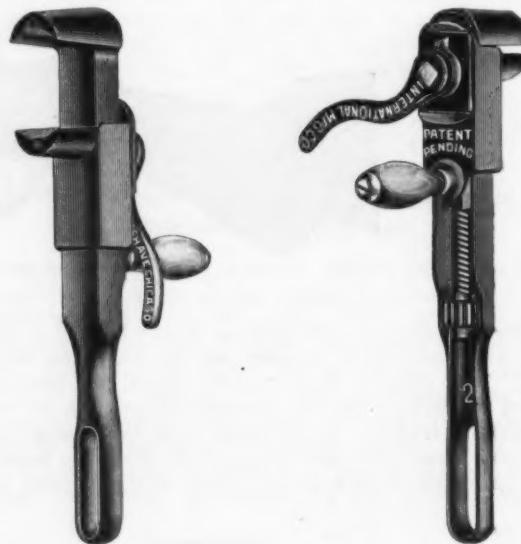
Tin Folding Machines.

The Peck, Stow & Wilcox Company, Southington, Conn., and 27 Murray street, New York, has just added a new tin folding machine to its extensive line of tins' machines, as here shown. The leading size is the No. 252, which turns locks of $\frac{1}{8}$ to 1 inch width, 20 inches long, and weighs 90 pounds. The No. 254, 30 inches, turns locks of same widths and weighs 170 pounds. Both folders are also made with a spring attachment, applied at the left, as seen in the detached sectional view, which is for counterbalancing the bar and facilitating quick operation. The folders so equipped, numbered 252 $\frac{1}{2}$ and 254 $\frac{1}{2}$, respectively, for the 20 and 30 inch sizes, are

*Bar Folding Machine for Sheet Metals.*

especially recommended by the company for the use of lithographers and printers for expeditiously binding or mounting show cards, calendars, hangers, &c. Both folders also have pivoted stops at left of machine for turning locks of two different angles, instead of all the way over as when folding roofing plates. An important feature of the four folders here described is the quick and accurate method of instantly setting the gauge for locks of any width within their capacity. This is accomplished by means of a drop lever in the center and front of the folder. A slot which is at right angles with the folding edge contains a pointed indicator flush with surface, by which the operator sets the gauge at any width of fold required according to the graduations of parts of an inch along the slot. The gauge is then locked rigidly by a turn of the thumb screw on right of projection in front. The adjustment of the folding bar for round or open locks in any kind of sheet metal is effected by using the socket wrench illustrated, the wedge that raises and lowers the wing being operated by a rack and pinion. This line of folders is used largely for folding sheets of tin plate, but can be adjusted to fold other material as thick as No. 22 gauge.

side, is offered by the International Mfg. Company, 1408 Wabash avenue, Chicago, Ill. By means of the thumb

*The Superior Wrench.*

The accompanying illustration shows a seasonable article put on the market by the Cronk & Carrier Mfg. Company of Elmira, N. Y. Trimming around walks, fences and house walls is a slow and annoying part of the summer lawn cutting and these shears are intended

wheel, in the handle, and screw the jaws are brought to fit a nut closely, while the forged lock lever at the top

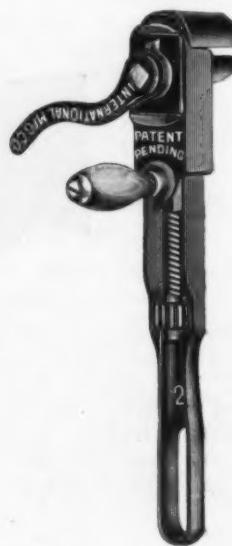
*Cronk's Grass Shears.*

to do the work with a minimum expenditure of time and trouble. They have $6\frac{1}{2}$ inch blades of oil tempered steel, fastened together with a nut lock to prevent their getting out of adjustment. The handles are of ash, heavy enough for all requirements, but calculated not to tire the arms

locks the jaws firmly on the nut. After the wrench is locked to the nut and the nut is started, the small handle is used to spin it off or on. The wrench is made in three lengths with a range for use on nuts from $\frac{3}{4}$ inch to 4 inches, either square or hexagon.

The Superior Wrench.

The wrench shown in the accompanying cuts, one of which illustrates the front and the other the reverse



White Frost All Steel Refrigerator.

The refrigerator shown herewith is made by the Metal Stamping Company, Jackson, Mich. The refrigerator is made throughout of galvanized and cold rolled steel. It is cylindrical in form and has two metal shelves, shown in Fig. 2. The shelves revolve on a central post, making access to any article on them most convenient by revolv-



Fig. 1.—White Frost All Steel Refrigerator.

ing the shelf. The shelves may also be quickly raised, lowered or removed. When they are removed or are cleared of contents the interior can be readily cleaned by a stream from a hose, or by the use of a cloth. Claim is made that the circulation of air from the ice chamber above to the provision chamber below is so scientifically planned that the provision chamber is kept so free from moisture that matches may be stored in it without injuring their igniting quality. The round form of refrigerator is commended by its maker, not only because a cylinder embodies the maximum storage space in a given

size, but because it has no corners in which unsanitary matter can find lodgment.

The space between the outer and inner walls of the refrigerator is filled with maltha and asbestos insulation.



Fig. 2.—Interior of All Steel Refrigerator.

The absence of any wood or other absorbent material in the interior or exterior of the refrigerator eliminates warping or shrinking and prevents molding or decay, making this refrigerator practically everlasting. Claim is also made that a material saving in ice is effected. Externally the refrigerator is attractive, being finished in white enamel, richly decorated.

N. C. Henderson, Fennimore, Wis., has sold a half interest in his Hardware business to George W. Blanchard. The store has been refitted and will continue to do business in general lines, as well as Gasoline Engines, Furnaces, hot water and steam heating, &c., under the style of Henderson & Blanchard.

PAINTS, OILS AND COLORS**White Lead, Zinc, &c.—**

	lb
Lead, English white, in Oil.	9½@ 9½
Lead, American white, in Oil:	
Lots of 500 lb or over.....	@ 6½
Lots less than 500 lb.....	@ 7
In Barrels.....	@ 6
Lead, White, in oil, 25 lb tin pails, add to keg price.....	@ ¼
Lead, White, in oil, 12½ lb tin pails, add to keg price.....	@ 1
Lead, White, in oil, 1 to 5 lb ass'ted tins, add to keg price	@ 1½
Lead, American, Terms: For lots 12 tons and over ¼¢ rebate; and 2½ for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2½ for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.	50@ 12½
Lead, White, Dry in bbls.....	@ 6
Zinc, American, dry.....	4½@ 4½
Zinc, French:	
Paris, Red Seal, dry.....	8½
Paris, Green Seal, dry.....	9½
Antwerp, Red Seal, dry.....	7½
Antwerp, Green Seal, dry.....	8½
Zinc, V. M. French, in Poppy Oil:	
Green Seal:	
Lots of 1 ton and over.....	11½@ 12½
Lots of less than 1 ton.....	11½@ 12½
Zinc, V. M. French, in Poppy Oil:	
Red Seal:	
Lots of 1 ton and over.....	10%@ 10%
Lots of less than 1 ton.....	10%@ 11%
Discounts—French Zinc—Discounts to buyers of 10 bbls. lots of one or mixed grades, 1%; 25 bbls., 2%; 50 bbls., 4%.	

Dry Colors—

	lb
Black, Carbon.	5 @10
Black, Drop, Amer.	4 @ 6
Black, Drop, Eng.	5 @15
Black, Ivory.	16 @20
Lamp, Com.	4½@ 6
Blue, Celestial.	4 @ 6
Blue, Chinese.	2 @ 2
Blue, Prussian.	2 @ 20
Blue, Ultramarine.	4½@ 15
Brown, Spanish.	2 @ 1
Carmine, No. 40.	33.50@ 3.50
Green, Chrome, ordinary.	3½@ 6

Colors in Oil—

	lb
Black, Lampblack.	12 @14
Blue, Chinese.	36 @46
Blue, Prussian.	32 @36
Blue, Ultramarine.	13 @16
Brown, Vandyke.	11 @14
Green, Chrome.	10 @15
Green, Paris.	12 @24

Animal, Fish and Vegetable Oils—

	gal.
Linseed, City, raw.....	30 @61
Linseed, City, boiled.....	32 @62
Linseed, State and West'n. raw.....	48 @65
Linseed, raw Calcutta.....	47 @65
Lard, Prime, Winter.....	57 @65
Lard, Extra No. 1.....	47 @65
Lard, No. 1.....	35 @65
Cotton-seed, Crude, f.o.b. mills.....	22½@65
Cotton-seed, Summer Yellow, Prime.....	21½@65
Cotton-seed, Summer Yellow, off grades.....	20 @65
Sperm, Crude.....	55 @65
Sperm, Natural Spring.....	55 @65
Sperm, Bleached Spring.....	55 @65
Sperm, Natural Winter.....	55 @65
Sperm, Bleached Winter.....	55 @65
Tallow, Prime.....	51 @65
Whale, Crude.....	42 @65
Whale, Natural Winter.....	42 @65
Whale, Bleached Winter.....	42 @65
Menhaden, Brown, Strained.....	28 @65
Menhaden, Light, Strained.....	29 @65
Menhaden, Bleached, Winter.....	31 @65
Menhaden, Ex-Bld. Winter.....	32 @65
Menhaden, Southern.....	16½@65
Cocoanut, Ceylon.....	2½ lb 7½@65
Cocoanut, Cochin.....	2½ lb 7½@65
Cod, Domestic, Prime.....	31 @65
Cod, Newfoundland.....	32 @65
Red, Elaine.....	29 @65
Red, Saponified.....	20 lb 3½@65
Olive, Italian, bbls.....	55 @65
Neatsfoot, prime.....	49 @65
Palm, Logos.....	20 lb 5½@65

Mineral Oils—

	gal.
Black, 29 gravity, 25@30 cold test.....	10½@11½
Black, 29 gravity, 15 cold test.....	11½@11½
Black, Summer.....	10½@11½
Cylinder, light filtered.....	18 @65
Cylinder, dark filtered.....	16 @65
Paraffine, 90-97 gravity.....	12½@65
Paraffine, 90½ gravity.....	11½@65
Paraffine, 88½ gravity.....	9½@65
Paraffine, Red.....	11½@65
In small lots ½ advance.	

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus $33\frac{1}{2}$ @ $33\frac{1}{2}$, & 10% signifies

that the price of the goods in question ranges from $33\frac{1}{2}$ per cent. discount to $33\frac{1}{2}$, and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1904, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Domestic, $\frac{1}{2}$ doz. \$3.00..... $33\frac{1}{2}\%$
North's $10\frac{1}{2}\%$

Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent..... $33\frac{1}{2}\%$

Taplin's Perfection..... $33\frac{1}{2}\%$

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American—

Eagle Anvils..... $\frac{1}{2}$ lb $7\frac{1}{2}$ @ $7\frac{1}{2}\%$
Hay-Budden, Wrought..... $33\frac{1}{2}\%$
Horseshoe brand, Wrought..... $33\frac{1}{2}\%$
Trenton $33\frac{1}{2}\%$

Imported—

Peter Wright & Sons..... $\frac{1}{2}$ lb $10\frac{1}{2}\%$
Anvil, Vise and Drill—
Millers Falls Co. \$18.00..... $15\frac{1}{2}$ &10%

Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Livingston Nail Co. $33\frac{1}{2}\%$

Augers and Bits—

Com. Double Spur..... $70\frac{1}{2}$ &10%
Jennings' Patn. reg. finish, $50\frac{1}{2}$ &10%

Boring Mach., Augers..... $70\frac{1}{2}$ &10%

Car Bits, 12-in. twist..... $50\frac{1}{2}$ &10%

Ford's Auger and Car Bits..... $40\frac{1}{2}$ &

Forstner Pat. Auger Bits..... $25\frac{1}{2}\%$

C. E. Jennings & Co.:
No. 10 ext. tip, H. Jennings' list. $25\frac{1}{2}\%$

No. 30, R. Jennings' list. $40\frac{1}{2}\%$

Russell Jennings' $25\frac{1}{2}$ & $10\frac{1}{2}\%$

L'Hommedieu Car Bits..... $15\frac{1}{2}\%$

Mayhew's Countersink Bits..... $45\frac{1}{2}\%$

Millers Falls. $50\frac{1}{2}$ & $33\frac{1}{2}\%$

Ohio Tool Co.'s Bailey Auger and Car Bits..... $40\frac{1}{2}$ &10%

Pugh's Black..... $20\frac{1}{2}\%$

Pugh's Jennings' Pattern..... $35\frac{1}{2}\%$

Snell's Auger Bits..... $60\frac{1}{2}\%$

Snell's Bell Hangers Bits..... $60\frac{1}{2}\%$

Snell's Car Bits, 12-in. twist..... $60\frac{1}{2}$ &10%

Wright's Jennings' Bits..... $60\frac{1}{2}\%$

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's small, \$18; large, \$36.... $50\frac{1}{2}$ &10%

Clark's Pattern, No. 1, $\frac{1}{2}$ doz. $32\frac{1}{2}\%$

No. 2, \$18..... $50\frac{1}{2}$ & $10\frac{1}{2}\%$

Ford's, Clark's Pattern..... $50\frac{1}{2}$ & $10\frac{1}{2}\%$

C. E. Jennings & Co., Steer's Pat. $25\frac{1}{2}\%$

Swan's $60\frac{1}{2}\%$

Gimlet Bits—

Per gro.

Common Dble. Cut....\$3.00@ $33\frac{1}{2}\%$

German Pattern, Nos. 1 to 10, \$4.00; 11 to 18, $25\frac{1}{2}\%$

Hollow Augers—

Bonney Pat., per doz. \$9.00@ $10\frac{1}{2}\%$

Ames $25\frac{1}{2}$ &10%

New Patent $25\frac{1}{2}$ &10%

Universal $20\frac{1}{2}\%$

Wood's Universal..... $25\frac{1}{2}\%$

Ship Augers and Bits—

Ford's $33\frac{1}{2}\%$ &5%

C. E. Jennings & Co.:
L'Hommedieu's $15\frac{1}{2}\%$

Watrous' $33\frac{1}{2}\%$

Ohio Tool Co.'s. $40\frac{1}{2}\%$

Snell's $40\frac{1}{2}\%$

Awl Hafts—See Hafts, Awl.

Awls—

Fred Awls: Handled $\frac{1}{2}$ doz. \$2.75@ $33\frac{1}{2}\%$

Unhandled, Shilded. $\frac{1}{2}$ doz. \$6.65@ $33\frac{1}{2}\%$

Unhandled, Patent. $\frac{1}{2}$ doz. \$6.65@ $70\frac{1}{2}\%$

Peg Awls: Unhandled, Patent. $\frac{1}{2}$ doz. \$16@ $33\frac{1}{2}\%$

Unhandled, Shilded. $\frac{1}{2}$ doz. \$6.65@ $70\frac{1}{2}\%$

Scratch Awls: Handled, Com. $\frac{1}{2}$ doz. \$23.50@ $40\frac{1}{2}\%$

Handled, Socket. $\frac{1}{2}$ doz. \$11.50@ $12\frac{1}{2}\%$

Hurwood $30\frac{1}{2}\%$

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Single Bit, base weights. (up to $3\frac{1}{2}$ lb.)

First Quality..... 56.50

Second Quality..... 56.00

NOTE.—Heavier Weights add Extras a per regular schedule.

Axle Grease—

See Grease, Axle

Axes—

Iron or Steel Concord, Loose Collar... $4\frac{1}{2}$ @ $33\frac{1}{2}\%$

Concord, Solid Collar... $4\frac{1}{2}$ @ $33\frac{1}{2}\%$

No. 1 Common, Loose... $3\frac{1}{2}$ @ $33\frac{1}{2}\%$

No. 1½ Com., New Style... $3\frac{1}{2}$ @ $33\frac{1}{2}\%$

No. 2 Solid Collar... $4\frac{1}{2}$ @ $33\frac{1}{2}\%$

Nos. 7, 8, 11 and 12... $7\frac{1}{2}$ @ $75\frac{1}{2}\%$

Nos. 13 to 14... $70\frac{1}{2}$ @ $75\frac{1}{2}\%$

Nos. 15 to 18... $75\frac{1}{2}$ @ $75\frac{1}{2}\%$

Nos. 19 to 22... $75\frac{1}{2}$ @ $75\frac{1}{2}\%$

Boxes, Axle—

Common and Concord, not turned lb. $4\frac{1}{2}$ @ $56\frac{1}{2}\%$

Common and Concord, turned lb. $5\frac{1}{2}$ @ $66\frac{1}{2}\%$

Half Patent.....lb. $8\frac{1}{2}$ @ $9\frac{1}{2}\%$

Bait—

Hendryx: A Bait..... $20\frac{1}{2}\%$

B Bait..... $20\frac{1}{2}\%$

Competitor Bait..... $20\frac{1}{2}\%$

Balances—

Sash—

Caldwell new list. $50\frac{1}{2}\%$

Pullman $50\frac{1}{2}$ @ $60\frac{1}{2}\%$

Spring—

Spring Balances..... $60\frac{1}{2}$ @ $60\frac{1}{2}\%$

Chatillon's: Light Spg. Balances..... $40\frac{1}{2}$ &10%

Straight Balances..... $40\frac{1}{2}\%$

Circular Balances..... $50\frac{1}{2}\%$

Large Dial..... $30\frac{1}{2}\%$

Barb Wire—

See Wire, Barb.

Bars—

Crow—

Steel Croubars, 10 to 40 lb.

per lb. $2\frac{1}{2}$ @ $33\frac{1}{2}\%$

Towel—

No. 10 Ideal, Nickel Plate. 8.50

Beams, Scale—

Scale Beams..... $40\frac{1}{2}$ @ $50\frac{1}{2}\%$

Chatillon's No. 1..... $30\frac{1}{2}\%$

No. 2..... $30\frac{1}{2}\%$

Standard..... $35\frac{1}{2}\%$

High Grade..... $50\frac{1}{2}$ @ $50\frac{1}{2}\%$

Beaters, Carpet—

Holt-Lyon Co.: No. 12 Wire Coppered $\frac{1}{2}$ doz. $30\frac{1}{2}\%$

Tinned..... 31.00

No. 11 Wire Coppered $\frac{1}{2}$ doz. 31.00

Tinned..... 31.00

No. 10 Wire Galvanized. 31.75

Western, W. G. Co.: No. 1 Electric..... 37.00

No. 2 Buffalo..... 39.00

No. 3 Perfection Dust. 38.00

Gilt Mfg. Co.: Improved Dover..... 30.00

No. 75 Improved Dover..... 36.50

No. 100 Improved Dover..... 37.00

No. 102 Improved Dover, Tin'd. 39.00

No. 150 Improved Dover, Hotel. 45.00

No. 152 Imp'd Dover, Hotel. 47.00

No. 200 Imp'd Dover Tumbler. 48.50

No. 202 Imp'd Dover Tumbler, T'd. 49.50

No. 300 Imp'd Dover Mammoth. 52.00

Wonder (S. S. & Co.), $\frac{1}{2}$ doz. net, \$6.00

Bellows—

Blacksmith, Standard List. $60\frac{1}{2}$ @ $70\frac{1}{2}$ &10%

Blacksmiths'—

Inch. 30 32 34 36 38 40

Each.\$3.25 3.30 3.40 4.50 5.00 5.75

Extra Length:

Each.\$3.75 4.25 4.75 5.25 6.00 7.00

Hand—

Inch. 6 7 8 9 10

Doz....\$4.50 5.00 5.50 6.00 6.50

Molders—

Inch. 9 10 11 12 14

Doz....\$8.00 9.00 10.50 12.50 14.50

Net Prices.

Bells—

Cow—

Ordinary goods.... $75\frac{1}{2}$ @ $75\frac{1}{2}$ &10%

High grade..... $70\frac{1}{2}$ @ $70\frac{1}{2}$ &10%

Jersey..... $75\frac{1}{2}$ @ $75\frac{1}{2}$ &10%

Texas Star..... $50\frac{1}{2}\%$

Door—

Abbe's Gong..... $45\frac{1}{2}\%$

Burton Gong..... $50\frac{1}{2}\%$

Home, R. & E. Mfg. Co. $55\frac{1}{2}$ &10%

Lever and Pull, Sargent's. $60\frac{1}{2}$ &10%

Trip Gong..... $50\frac{1}{2}$ @ $50\frac{1}{2}$ &10%

Yankee Gong..... $55\frac{1}{2}\%$

Hand—

Hand Bells, Polished, Brass. $60\frac{1}{2}$ @ $60\frac{1}{2}$ &10%

White Metal..... $60\frac{1}{2}\%$

Nickel Plated..... $50\frac{1}{2}$ @ $50\frac{1}{2}$ &10%

Silver Chime..... $60\frac{1}{2}$ @ $60\frac{1}{2}$ &10%

Cone's Globe Hand Bells..... $33\frac{1}{2}$ @ $33\frac{1}{2}\%$

Silver Chime..... $33\frac{1}{2}$ @ $33\frac{1}{2}\%$

Miscellaneous—

Farm Bells..... $1\frac{1}{2}$ lb. $2\frac{1}{2}$ ¢

Steel Alloy Church and School

50d@ $10\frac{1}{2}$ ¢@ $60\frac{1}{2}\%$

American Tube & Stamping Co.

50d@ $10\frac{1}{2}$ ¢@ $75\frac{1}{2}\%$

Gongs..... $75\frac{1}{2}$ @ $75\frac{1}{2}\%$

Table Call Bells..... $50\frac{1}{2}$ @ $50\frac{1}{2$

Hendryx Bronze:
700, 800 series..... 40&10%
Hendryx Enamelled..... 40&10%
Calipers—See *Compasses*.
Calks, Toe and Heel—
Blunt, 1 prong..... per lb. 14c 14¢
Sharp, 1 prong, per lb., 14c@14¢
Gautier, Blunt..... 44c@44¢
Gautier, Sharp..... 44c@44¢
Perkins', Blunt Toe..... \$1 lb. 36¢
Perkins', Sharp Toe..... \$1 lb. 4.15¢
Perkins', Sharp Toe..... \$1 lb. 4.15¢

Can Openers—See *Openers, Can*.**Cans, Milk**—

Illinois Pattern..... \$1.35 1.85 2.05 each.
New York Pattern..... 1.50 2.20 2.45 each.
Baltimore Pattern..... 1.50 2.20 2.45 each.
Dubuque..... 1.35 1.60 1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:
3 5 10 gal.
\$18.00 60.00 129.60 gro. net.

Caps, Percussion—

Eley's E. B..... 52@55¢
G. D..... per M 34@35¢
F. L..... per M 40@42¢
G. E..... per M 48@50¢
Musket..... per M 62@63¢

Primers—

Berdan Primers, \$2 per M... 30%
B. L. Caps (Sturtevant Shells)
\$2 per M... 20%
All other primers per M. \$1.52@1.60

Cartridges—

Blank Cartridge:
32 C. F., .35.50..... 1065%
38 C. F., .37.00..... 1065%
22 cal. Rim, .31.50..... 1065%
32 cal. Rim, .32.75..... 1065%
B. B. Caps, Con. Ball, Swg'd. \$1.90
B. B. Caps, Round Ball..... \$1.49
Central Fire..... 25%
Target and Sporting Rifle..... 1565%
Primed Shells and Bullets. 15&10%
Rim Fire, Sporting..... 50%
Rim Fire, Military..... 1565%

Casters—

Bed..... 70@70.610%
Plate..... 60&10@60.610.65%
Philadelphia..... 75@75.610%
Acme, Ball Bearing..... 33¢
Boss..... 70&10%
Boss, Anti-Friction..... 70&10%
Gem (Roller Bearing)..... 80
Martin's Patent (Phoenix)..... 45%
Standard Ball Bearing..... 45%
Tucker's Patent low list..... 30%
Yale (Double Wheel) low list..... 50%

Cattle Leaders—

See *Leaders, Cattle*.
Chain, Coil—
American Coil, Straight Link:
3-16 3/4 5-16 3/8 7-16 1/4 9-16
87.50 5.35 3.40 3.70 3.55 3.45 3.40
5% 3/4 7/8 1 to 1/4 inch.
3.35 3.30 3.25 3.25 pcr 100 lb.
German Coil..... 60&10@60.610%
Halters and Ties—
Halter Chains..... 60&10@60.610&10%
German Pattern Halters, Ties,
list July 24, '97..... 60&10@60.610%
Coc Ties..... 60@60@10%
Trace, Wagon, &c.—
Traces, Western Standard: 100 pr.
61/2-6-3, Straight, with ring, \$23.50
61/2-6-2, Straight, with ring, \$21.50
61/2-8-2, Straight, with ring, \$28.00
61/2-10-2, Straight, with ring, \$32.00
NOTE.—Add 2¢ per pair for Hooks.
Twist Traces 2¢ per pair higher than
Straight Link.

Trace, Wagon and Fancy Chains—

Jack Chain, list July 10, '98:
Iron..... 60&10@60.610&5%
Brass..... 60&10@60.610.65%
Safety Chain..... 75@75.610&5%
Gal. Pump Chain..... 1b. 5@51/4%
Covert Mfg. Co.:
Breast..... 35&5%
Halter..... 35&5%
Heel..... 35&5%
Rein..... 35&5%
Stallion..... 35&5%
Covert Sad. Works:
Breast..... 70%
Halter..... 70%
Hold Back..... 70%
Rein..... 70%
Oneida Community:
Am. Coil and Halters..... 40@40%
Am. Cow Ties..... 45@50%
Eureka Coil and Halter..... 45@50%
Niagara Coil and Halter..... 45@50%
Niagara Cow Ties..... 45@50@40&5%
Niagara Wire Dog Chains, 45@50@40%
Wire Goods Co.:
Dog Chain..... 70&10%
Universal Dbl.-Jointed Chain..... 50%

Chalk—(From Jobbers.)

Carpenters' Blue..... gro. 55@38¢
Carpenters' Red..... gro. 30@33¢
Carpenters' White..... gro. 25@28¢
See also Crayons.

Checks, Door—

Bardsley's..... 45%
Columbia..... 50&10%
Eclipse..... 50&10%

Chests, Tool—

American Tool Chest Co.:
Boy's Chests, with Tools..... 55%
Youth's Chests, with Tools..... 49%
Gentlemen's Chests, with Tools. 30%
Farmers' Carpenters', etc., Chests,
with Tools..... 25%
Machinists' and Pipe Fitters'
Chests, Empty..... 50%
Tool Cabinets..... 50%
C. E. Jennings & Co.'s Machinists'
Tool Chests..... 35&10%
See also Crayons.

Chisels—

Socket Framing and Firmer
Standard List..... 75@75.610%
Buck Bros..... 30%
Charles Buck..... 30%
C. E. Jennings & Co. Socket Firmer
No. 10..... 60%
C. E. Jennings & Co. Socket Framing
No. 15..... 60%
Ohio Tool Co.'s..... 70%
Swan's..... 70%
L. & I. J. White..... 30@30&5%

Tanged—

Tanged Firmer, 33 1-3@33 1-3&10%
Buck Bros..... 30%
Charles Buck..... 30%
C. E. Jennings & Co. Nos. 191, 181, 25%
L. & I. J. White, Tanged..... 25&5%
Cold—
Cold Chisels, good quality. 13@15¢
Cold Chisels, fair quality. 11@12¢
Cold Chisels, ordinary. 9@10¢

Chucks—

Beach Pat., each \$8.00..... 35&5%
Empire..... 25%
Blacksmiths'..... 25%
Jacobs' Drill Chucks..... 35%
Pratt's Positive Drive..... 25%
Skinner Patent Chucks:
Independent Lathe Chucks..... 50%
Universal..... 50%
Combination..... 50%
Drill Chucks, New Model..... 30%
Drill Chucks, Standard..... 45%
Drill Chuck, Skinner Pat., 0, 1, 2.35%
Drill Chucks, Skinner Pat., 3, 4, 5, 6, 7, 8..... 35%
Drill Chucks, Positive Drive..... 30%
Planer Chucks..... 25%
Face Plate Jaws..... 40%
Standard Tool Co.:
Improved Drill Chuck..... 45%
Union Mfg. Co.:
Combination..... 50%
Czar Drill..... 38%
Combination Geared Scroll..... 40%
Geared Scroll..... 40%
Independent Steel..... 40%
Union Drill..... 45%
Independent Iron F. Plate Jaws, 40%
Independent Steel F. Plate Jaws, 40%
Wentworth Patent Chucks:
Lathe Chucks..... 50%
Little Giant Auxiliary Drill..... 50%
Little Giant Double Grip Drill..... 50%
Little Giant Drill, Improved..... 50%
Oneida Drill..... 50%
Scroll Combination Lathe..... 50%
Clamps—

Adjustable, Hammers..... 20@20&5%
Cabinet, Sargent's..... 50%
Carriage Makers', F. S. & W. Co. 50%
Carriage Makers', Sargent's..... 60%
Besly, Parallel..... 33&10%
Lineman's, Utica Drop Forge & Tool
Co., Co. Saw Clamps, see Vises, Saw Fliers.
Cleaners, Drain—

Iwan's Champion, Adjustable..... 55%
Iwan's Champion, Stationary..... 45%
Sidewalk—
Star Socket, All Steel. \$2 doz. \$4.05 net
Star Shank, All Steel. \$2 doz. \$3.24 net
W. & C. Shank, All Steel, \$2 doz.,
7/8 in., \$3.00; 8 in., \$3.25.
Cleavers, Butchers'—

Foster Bros..... 30%
New Haven Edge Tool Co. 8..... 45%
Fayette R. Plumb..... 33@33&10%
L. & I. J. White..... 30%
Clippers—

Chicago Flexible Shaft Company:
'98 Chicago Horse..... \$8.75 % 15%
1902 Chicago Horse..... 10.75 % 15%
20th Century Horse, each..... \$5.00 % 20%
Lightning Belt..... \$15.00 % 15%
Chicago Belt..... \$20.00 % 15%
Stewart's Patent Sheep, \$12.75 % 20%
NOTE.—Add 2¢ per pair for Hooks.
Twist Traces 2¢ per pair higher than
Straight Link.

Trace, Wagon, &c.—
Traces, Western Standard: 100 pr.
61/2-6-3, Straight, with ring, \$23.50
61/2-6-2, Straight, with ring, \$21.50
61/2-8-2, Straight, with ring, \$28.00
61/2-10-2, Straight, with ring, \$32.00
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Brass..... 60&10@60.610.65%
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Gal. Pump Chain..... 1b. 5@51/4%
Covert Mfg. Co.:
Breast..... 35&5%
Halter..... 35&5%
Heel..... 35&5%
Rein..... 35&5%
Stallion..... 35&5%
Covert Sad. Works:
Breast..... 70%
Halter..... 70%
Hold Back..... 70%
Rein..... 70%
Oneida Community:
Am. Coil and Halters..... 40@40%
Am. Cow Ties..... 45@50%
Eureka Coil and Halter..... 45@50%
Niagara Coil and Halter..... 45@50%
Niagara Cow Ties..... 45@50@40&5%
Niagara Wire Dog Chains, 45@50@40%
Wire Goods Co.:
Dog Chain..... 70&10%
Universal Dbl.-Jointed Chain..... 50%

Combs, Curry—
Metal Stamping Co..... 40%
Mane and Tail—

Covert's Saddlery Works..... 60&10%
Compasses, Dividers, &c.—

Ordinary Goods..... 75@75.610%
Bemis & Call Hdw. & Tool Co.:
Dividers..... 65%
Calipers, Double..... 65%
Calipers, Inside or Outside..... 65%
Calipers, Wing..... 60%
Compasses..... 50%
Conductor Pipe,—

L. C. L. to Dealers:
Galvanized.

Territory. Nested. Not nested.
Eastern..... 70&15%
Central..... 70&7.5%
Southern..... 70&21.5%
So. Western..... 60&29%
Copper.

Eastern..... 50&5%
Central..... 50&2.5%
Southern..... 50%
So. Western..... 40&10.5%
Terms, 60 days; 2% cash 10 days. Factory
shipments generally delivered.

See also *Eave Troughs*.

Checks, Door—

Bardsley's..... 45%
Columbia..... 50&10%
Eclipse..... 50&10%

Chests, Tool—

American Tool Chest Co.:
Boy's Chests, with Tools..... 55%
Youth's Chests, with Tools..... 49%
Gentlemen's Chests, with Tools. 30%
Farmers' Carpenters', etc., Chests,
with Tools..... 25%
Machinists' and Pipe Fitters'
Chests, Empty..... 50%
Tool Cabinets..... 50%
C. E. Jennings & Co.'s Machinists'
Tool Chests..... 35&10%

See also Crayons.

Chains, Tool—

See *Leaders, Cattle*.

Chisels—

See *Openers, Can*.

Cans, Milk—

See *Illinois Pattern*.

Caps, Oil—

See *Buffalo Family Oil Cans*:

3 5 10 gal.

Illinois Pattern..... \$1.35 1.85 2.05 each.

New York Pattern..... 1.50 2.20 2.45 each.

Baltimore Pattern..... 1.50 2.20 2.45 each.

Dubuque..... 1.35 1.60 1.75 each.

Cans, Oil—

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Caps, Oil—

See *Buffalo Family Oil Cans*:

3 5 10 gal.

Illinois Pattern..... \$1.35 1.85 2.05 each.

Wrought Iron Hinges—

Strap and T Hinges, do., list

December 20, 1904:

Light Strap Hinges...	20%
H'y Strap H'g's...	75&10%
Light T Hinges...	65%
Heavy T Hinges...	60%
Extra H'y T H'g's...	70&10%
Hinge Haps...	50%
Cor. Heavy Strap...	75&10%
Cor. Ex. Heavy Strap...	70&10%

Screw Hook	6 to 12 in.	lb. 31/2¢
and Strap.	11 to 20 in.	lb. 31/2¢

22 to 36 in.	lb. 3 c
--------------	---------

Screw Hook and Eye:

3/4 to 1 inch...	lb. 6 *
5/8-inch...	lb. 7 *
5/8-inch...	lb. 9 *

Hitchers, Stall—

Cover Mfg. Co. Stall Hitchers...

Hods—Coal—

Per doz.

Inch...	15 16 17 18
Galv. Open...	\$2.50 2.75 3.00 3.25
Jap. Open...	1.90 2.10 2.25 2.55
Galv. Funnel...	3.00 3.30 3.60 3.90
Jap. Funnel...	2.45 2.65 2.85 3.00

Masons, Etc.—

Cleveland Wire Spring Co.: Steel Mortar...

Steel Brick...

Hoes—Eye—

Scovil and Oval Pattern...

60&10/(60&10&10%)

Grub, list Feb. 23, 1899...

70&10/(675&10%)

D. & H. Scovil...

Handled—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using lists of August 1, 1899, or selling at net prices.

Ft. Madison Cotton Hoe...

70&10/10% Ft. Madison Crescent Cultivator Hoe...

70&10% Ft. Madison Mattock Hoe:

Regular Weight...

10 doz. \$4.00

Ft. Madison Sprouting Hoe...

50% Ft. Madison Dixie Tobacco Hoe...

75&10/47½%

Kretzinger's Cut Easy...

70&10% Warren Hoe...

45&10% W. & C. Ivanhoe...

75&2½%

B. B. 6 in. Cultivator Hoe...

\$3.15

B. B. 6½ in.

\$3.35

Acme Wedding...

34.35

W. & C. Lutning Shuffle Hoe...

\$1.85

Hoisting Apparatus—

See Machines, Hoisting.

Holders—Bit—

Angular, 1/2 doz. \$24.00...

45&10% Do—

Bardsley's...

45%

Empire...

50%

Pullman...

50%

File and Tool—

Nicholson File Holders and File Handles...

33/4@40%

Fruit Jar—

Triumph Fruit Jar Holder, 1/2 gross, \$10.80; 1/2 doz. \$1.25

Hooks—Cast Iron—

Bird Cage, Reading...

40% Bird Cage, Sargent's List...

60&10% Ceiling, Sargent's List...

50&10&10% Clothes Line, Reading List...

40% Clothes Line, Sargent's List...

50&20&10% Coat and Hat, Sargent's List...

70% Clothes Line, Stowell's...

70% Coat and Hat, Reading...

45&20% Coat and Hat, Stowell's...

70% Coat and Hat, Wrightsville...

45% Harness, Reading List...

40% Harness, Stowell's...

60% School House, Stowell's...

Wire—

Belt...

80&10@.

75&10@75&10&5%

Atlas, Coat and Hat:

Single Cases...

75/10% 10 Case Lots...

75&10% Columbian Hdw. Co., Gem...

60&10% Parker Wire Goods Co., King...

75&10% Van Wagoner, Coat and Hat...

70% Western W. G. Co., Molding...

75% Wire Goods Co.:

Acme...

60&10% Chief...

70% Crown...

70&10% Czar...

45&10% V Brace...

50&10% Czar Harness...

Wrought Iron—

Box, 6 in., per doz. \$1.00; 8 in.

\$1.25; 10 in., \$2.50.

Cotton...

.

Wrought Staples, Hooks, &c.—

See Wrought Goods.

Miscellaneous—

Hooks, Bench, see Stops, Bench.

Bush, Light, doz. \$1.75 Medium,

\$5.35; Heavy, \$6.25

Grass, best, all sizes, per doz. \$1.50

Grass, common grades, all sizes, per doz.

31.30 Whiffletree...

1b. 5%@64

Hooks and Eyes:

Brass...

60&10/5@60&10&10%

Malleable Iron...

70&10@70&10&5%

Covert Mfg. Co. Gate and Scuttle Hooks...

35%

Covert Saddlery Works' Self Locking Gate and Door Hook...

50%

Ft. Madison Cut-Easy Corn Hooks, 3/4 doz. \$3.25 net

Bench Hooks—See Bench Stops.

Corn Hooks—See Knives, Corn.

Horse Nails—

See Nails, Horse.

Horseshoes—

See Shoes, Horses.

Hose, Rubber—

Garden Hose, 3/4-inch:

Competition...

ft. 5 @ 6 ¢

3-ply Standard...

ft. 8 @ 9 ¢

4-ply Standard...

ft. 10 @ 11 ¢

3-ply extra...

ft. 11 @ 13 ¢

4-ply extra...

ft. 14 @ 16 ¢

Cotton Garden, 3/4-in., coupled:

Low Grade...

ft. 8 @ 9 ¢

Fair Quality...

ft. 10 @ 11 ¢

Irons—Sad—

From 4 to 10...

lb. 24/4@3 ¢

B. B. Sad Irons...

lb. 31/4@3½¢

Chinese Laundry...

lb. 34/4@5 ¢

Chinese Sad...

lb. 4 @ 4½ ¢

Mrs. Potts' cents per set:

Noa...

50 55 60 65

Jap'd Tops...

62 59 72 69

Tin'd Tops...

65 62 75 72

New England Pressing, lb. 34/4@4 ¢

Pinking—

Pinking Irons...

doz. 50@60¢

Soldering—

Soldering Coppers, 2½ & 3 2/3@2½¢

1½ & 2...

22@3¢

Jacks, Wagon—

Covert Mfg. Co.:

Auto Screw...

30&2½%

Steel...

45%

Covert's Saddlery Works:

Daisy...

60&10%

Victor...

60

Lockport...

50&10&5

Lane's Steel...

50&10&5

Richards' Tiger Steel, No. 130...

40%

Drawing—

Standard List...

75%

C. E. Jennings & Co., Nos. 45, 46, 60

Improved Jennings & Griffin, Nos. 41, 42, 60

Ohio Tool Co.'s...

70

Swan's...

70&10&2½

Watrous...

16½

L. & J. White...

20&5¢

Hay and Straw—

Serrated Edge...

per doz. \$5.25@5@5%

Iwan's Sickle Edge...

per doz. \$9.50

Iwan's Serrated...

per doz. \$10.00

Mincing—

Buffalo...

per gro. \$1.15@1.20

Miscellaneous—

Farriers'...

doz. \$3.00@3.25

Wostenholm's...

per doz. \$3.00@3.25

Knobs—

Base, 2½-inch, Birch, or Maple,

Rubber tip...

gro. \$1.15@1.20

Carriage, Jap., all sizes...

gro. 40¢@45¢

Door—

Door, Mineral...

per doz. 65@70¢

Door, Por. Jap'd...

per doz. 70@75¢

Door, Por. Nickel...

per doz. \$2.05@2.15

Door, Por. Nickel...

per doz. 50&5@50%

Lanterns—Tubular—

Regular Tubular, No. 0...

per doz. \$4.25@4.85¢

Lift Tubular, No. 0...

per doz. \$4.50@5.15

Hinge Tubular, No. 0...

per doz. \$4.50@5.15

Other Styles...

40&10@40&10&5%

Bull's Eye Police—

No. 1, 2½-inch...

per doz. \$2.50@2.75

No. 2, 3-inch...

per doz. \$2.75@

Sand and Emery—

Flint Paper and Cloth.
60@60&10%
Garnet Paper and Cloth.
25%
Emery Paper and Cloth.
50@50&10@60%

Parers—Apple—

Advance	doz.	\$4.00
Baldwin	doz.	\$4.00
Bonanza Improved	each	\$6.50
Daisy	doz.	\$4.00
Dandy	each	\$7.50
Eureka Improved	each	\$20.00
Family Bay State	doz.	\$15.00
Improved Bay State	doz.	\$36.00
Little Star	doz.	\$7.00
New Lightning	doz.	\$7.00
Reading 72	doz.	\$3.25
Reading 78	doz.	\$6.25
Rocking Table	doz.	\$6.25
Turn Table '98	doz.	\$6.00
White Mountain	doz.	\$5.00

Potato—

Saratoga	doz.	\$7.00
White Mountain	doz.	\$7.00

Picks and Mattocks—

List Feb. 23, 1899	70.65@75%
Cronk's Handled Mattock	50@50&10%
doz., \$6.40	53% %

Pinking Irons—*See Irons, Pinking.***Pins, Escutcheon—**

Brass	60@60&10%
Iron, list Nov. 11, '85	60@60&10%

Pipe, Cast Iron Soil—*Carload lots.*

Standard, 2-6 in.	60%
Extra Heavy, 2-6 in.	70%
Fittings	75%

Pipe, Merchant—*Carload Lots.*

Steel. Iron.	
Blk. Galv.	Blk. Galv.
1/4 & 1/2 in. 67%	51% 65% 49% 7%
1/2 & 1/4 in. 71%	59% 69% 57% 7%
5/8 to 6 in. 75%	65% 73% 63% 7%
7 to 12 in. 70%	55% 68% 52% 7%

Pipe, Vitrified Sewer—*Carload lots.*

Standard Pipe and Fittings, 2 to 21 in.	
New England	68%
New York and New Jersey	71%
Maryland, Delaware, E. Pa.	75%
West. Pa. and West Va.	71%
Virginia	76%
Ohio, Michigan and Ky.	77%
Indiana	77%

NOTE.—Carload lots are generally delivered.

Pipe, Stove—

Edwards' Nested Stove Pipe:	
C. L. L. C. L.	
5 in., per 100 joints	\$7.00 \$8.00
6 in., per 100 joints	7.50 8.50
7 in., per 100 joints	8.50 9.50

Planes and Plane Irons—*Wood Planes—*

Bench, first qual.	40@40&10%
Bench, Second qual.	50@50&10%
Molding	53%@50@10%
Bailey's (Stanley R. & L. Co.)	40%
Chapin-Stephens Co.:	

Pipes, Iron Planes—

Bench, First Quality	40@40@10%
Bench, Second Quality	50@50@10%
Molding	53%@53@10%
Toy and German	40@40@10%
Chaplin's	60%

Ohio Tool Co.:	
Bench, First Quality	40@40@10%
Bench, Second Quality	50@50@10%
Molding	53%@53@10%
Adjustable Wood Bottom	50%

Union	60%

Iron Planes—

Bailey's (Stanley R. & L. Co.)	40%
Chaplin-Stephens Co.	50@50@10%
Ohio Tool Co.	30@30@10%
Stanley R. & L. Co.	35%
Union	50%

L. & I. J. White	20@20@5%

Plane Irons—

Wood Bench Plane Irons.	25@10@30%
Buck Bros.	30%

Chapin-Stephens Co.	30@30@10%
Ohio Tool Co.	30%

Stanley R. & L. Co.	35%
Union	50%

L. & I. J. White	20@20@5%

Planters, Corn, Hand—

Kohler's Eclipse	per doz. \$5.00

Plates—

Felco	lb. 3/4@1/4
Self-Sealing Pie Plates (S. S. & Co.), per doz.	\$2.00

Pliers and Nippers—

Button Pliers	75@10@80%
Gas Burner, per doz. 5 in.	1.25

@ \$1.30; 6 in., \$1.45 @ \$1.50.	
Gas Pipe, 7 8 10 12-in.	

32.00	\$2.25	\$3.00	\$3.75

Acme Nippers	50@50@5%
Cronk & Carrier Mfg. Co.	

American Button	75@10%
Cronk's Improved Button	60@10%

Improved Button	60@10%
St. Louis Pattern	50%

Combination and others	35@%
Heller's Farriers' Nippers, Pliers and Tools	60@10@40@10@10%

P. S. & W. Tinner's Cutting Nippers	30@30@10%
Swedish Side, End and Diagonal Cutting Pliers	50%

Utica Drop Forge & Tool Co.	
Pliers and Nippers, all kinds	40%

Chapin-Stephens Co.:	
Plumbs and Levels	30@30@10@10@10%

Chapin's Imp. Brass Cor.	40@40@10@10@10%
Pocket Levels	30@30@10@10@10%

Disston's Plumb and Levels	70%
Disston's Pocket Levels	70%

Poachers, Egg—

Buffalo Steam Egg Poachers, per doz.	
No. 1, \$6.00; No. 2, \$9.00; No. 3, \$9.00; No. 4, \$12.00	50%

Points, Glaziers'—

Bulk and 1-lb. papers, lb. 8/4@1/4	
1/2-lb. papers..... lb. 9/4@1/4	
1/4-lb. papers..... lb. 9/4@1/4	

Pokes, Animal—

Ft. Madison Hawkeye..... per doz.	32.25
Ft. Madison Western..... per doz.	4.00

Police Goods—

Manufacturers' Lists	25@25@5%
Tower's	25%

Polish—Metal—

Prestoline Liquid, No. 1 (1 pt.)	\$.30

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Thread No. 2, 1/4-in. & up, lb. 5%
Old Colony Manila Transmission
Rope $\frac{1}{2}$ lb. 17½¢

Wire Rope—

Galvanized $\frac{1}{2}$ lb. 21½%
Plain $\frac{1}{2}$ lb. 21½%

Ropes, Hammocks—

Covert Mfg. Co.:
Jute 50%
Sisal 30&10%
Covert Saddlery Works 60&5%

Rulers, Desk—

Simpson & Son:
Boxwood and Maple 30&10%

Rules—

Boxwood 60&10&10%
Ivory 35&10@35&10&5%

Chapin-Stephens Co.:
Boxwood 60&60&10%
Flexifold 27&10&10&2½%
Ivory 35&35&10&10%
Miscellaneous 50&50&10&10%
Combination 55&55&10%
Stationers 10&10&10%
Keuffel & Esser Co.:
Folding, Wood 35&10%
Folding, Steel 33&10%
Lufkin's Steel 50&10%
Lufkin's Lumber 60%
Stanley R. & L. Co.:
Boxwood 62½%
Ivory 45%
Miscellaneous 60%
Zig Zag 40%
Zig Zag, Pin Joint 42½%
Upson Nut Co.:
Boxwood 60&60&10%
Ivory 35&10@35&10&10%

Sash Balances—

See Balance, Sash.

Sash Locks—

See Locks, Sash.

Sash Weights—

See Weights, Sash.

Sausage Stuffers or Fillers—

See Stuffers or Filters, Sausage.

Saw Frames—

See Frames, Saw.

Saw Sets—

See Sets, Saw.

Saw Tools—

See Tools, Saw.

Saws—

Atkins':
Circular 50%
Band 50&10@60%
Cross Cuts 35&5%
Mulay, Mill and Drag 50%
One-Man Saw 40%
Wood Saws 40%
Hand, Compass, &c. 40%
Chapin-Stephens Co.:
Turning Saws and Frames 30&30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws 30&10&10%

Dissom's:
Circular, Solid and Inv'ted Tooth 50%
Band, 2 to 14 in. wide 60%
Band, 14 to 18% 60%
Crosscuts 50%
Narrow Crosscuts 55%
Mulay, Mill and Drag 50%
Framed Woodsaws 35%
Wood Saw Blades 35%
Wood Saw Rods 25%
Hand Saws, Nos. 12, 19, 9, 16, d100, D8, 120, 76, 77, 8 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c. 25%
Butcher Saws and Blades 35%
C. E. Jennings & Co.'s:
Back Saws 25%
Butcher Saws 30%
Compass and Key Hole Saws 30&5%
Framed Wood Saws 30%
Hand Saws 20&24%
Wood Saw Blades 35%
Millers Falls:
Butcher Saws 15&10%
Star Saw Blades 15&10%
Peace & Richardson's Hand Saws 30%
Simonds':
Circular Saws 50%
Crescent Ground Cross Cut Saws 35%
One-Man Cross Cuts 40&19%
Gang Mill, Mulay and Drag Saws 50%
Band Saws 50%
Back Saws 25&25&7½%
Butcher Saws 35&35&7½%
Hand Saws 25&25&7½%
Hand Saws, Bay State Brand 45%
Compass, Key Hole, &c. 25&25&7½%
Wood Saws 35&35&7½%
Springfield Mach. Saw Co.:
Diamond Kitchen Saws 40&10@50%
Butcher Saw Blades 35&40%
Wheeler, Madden & Clemson Mfg. Co.'s: Cross Cut Saws 50%
Hack Saws—

Aiken's Hack Saw Blades A A A. 35%
Dissom's:
Concave Blades 25%
Keystone 40%
Hack Saw Frames 25%
Fitchburg File Works, The Best 25%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180, 185, 190, 195, 200, 205, 210, 215, 220, 225, 230, 235, 240, 245, 250, 255, 260, 265, 270, 275, 280, 285, 290, 295, 300, 305, 310, 315, 320, 325, 330, 335, 340, 345, 350, 355, 360, 365, 370, 375, 380, 385, 390, 395, 400, 405, 410, 415, 420, 425, 430, 435, 440, 445, 450, 455, 460, 465, 470, 475, 480, 485, 490, 495, 500, 505, 510, 515, 520, 525, 530, 535, 540, 545, 550, 555, 560, 565, 570, 575, 580, 585, 590, 595, 600, 605, 610, 615, 620, 625, 630, 635, 640, 645, 650, 655, 660, 665, 670, 675, 680, 685, 690, 695, 700, 705, 710, 715, 720, 725, 730, 735, 740, 745, 750, 755, 760, 765, 770, 775, 780, 785, 790, 795, 800, 805, 810, 815, 820, 825, 830, 835, 840, 845, 850, 855, 860, 865, 870, 875, 880, 885, 890, 895, 900, 905, 910, 915, 920, 925, 930, 935, 940, 945, 950, 955, 960, 965, 970, 975, 980, 985, 990, 995, 1000, 1005, 1010, 1015, 1020, 1025, 1030, 1035, 1040, 1045, 1050, 1055, 1060, 1065, 1070, 1075, 1080, 1085, 1090, 1095, 1100, 1105, 1110, 1115, 1120, 1125, 1130, 1135, 1140, 1145, 1150, 1155, 1160, 1165, 1170, 1175, 1180, 1185, 1190, 1195, 1200, 1205, 1210, 1215, 1220, 1225, 1230, 1235, 1240, 1245, 1250, 1255, 1260, 1265, 1270, 1275, 1280, 1285, 1290, 1295, 1300, 1305, 1310, 1315, 1320, 1325, 1330, 1335, 1340, 1345, 1350, 1355, 1360, 1365, 1370, 1375, 1380, 1385, 1390, 1395, 1400, 1405, 1410, 1415, 1420, 1425, 1430, 1435, 1440, 1445, 1450, 1455, 1460, 1465, 1470, 1475, 1480, 1485, 1490, 1495, 1500, 1505, 1510, 1515, 1520, 1525, 1530, 1535, 1540, 1545, 1550, 1555, 1560, 1565, 1570, 1575, 1580, 1585, 1590, 1595, 1600, 1605, 1610, 1615, 1620, 1625, 1630, 1635, 1640, 1645, 1650, 1655, 1660, 1665, 1670, 1675, 1680, 1685, 1690, 1695, 1700, 1705, 1710, 1715, 1720, 1725, 1730, 1735, 1740, 1745, 1750, 1755, 1760, 1765, 1770, 1775, 1780, 1785, 1790, 1795, 1800, 1805, 1810, 1815, 1820, 1825, 1830, 1835, 1840, 1845, 1850, 1855, 1860, 1865, 1870, 1875, 1880, 1885, 1890, 1895, 1900, 1905, 1910, 1915, 1920, 1925, 1930, 1935, 1940, 1945, 1950, 1955, 1960, 1965, 1970, 1975, 1980, 1985, 1990, 1995, 2000, 2005, 2010, 2015, 2020, 2025, 2030, 2035, 2040, 2045, 2050, 2055, 2060, 2065, 2070, 2075, 2080, 2085, 2090, 2095, 2100, 2105, 2110, 2115, 2120, 2125, 2130, 2135, 2140, 2145, 2150, 2155, 2160, 2165, 2170, 2175, 2180, 2185, 2190, 2195, 2200, 2205, 2210, 2215, 2220, 2225, 2230, 2235, 2240, 2245, 2250, 2255, 2260, 2265, 2270, 2275, 2280, 2285, 2290, 2295, 2300, 2305, 2310, 2315, 2320, 2325, 2330, 2335, 2340, 2345, 2350, 2355, 2360, 2365, 2370, 2375, 2380, 2385, 2390, 2395, 2400, 2405, 2410, 2415, 2420, 2425, 2430, 2435, 2440, 2445, 2450, 2455, 2460, 2465, 2470, 2475, 2480, 2485, 2490, 2495, 2500, 2505, 2510, 2515, 2520, 2525, 2530, 2535, 2540, 2545, 2550, 2555, 2560, 2565, 2570, 2575, 2580, 2585, 2590, 2595, 2600, 2605, 2610, 2615, 2620, 2625, 2630, 2635, 2640, 2645, 2650, 2655, 2660, 2665, 2670, 2675, 2680, 2685, 2690, 2695, 2700, 2705, 2710, 2715, 2720, 2725, 2730, 2735, 2740, 2745, 2750, 2755, 2760, 2765, 2770, 2775, 2780, 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3615, 3620, 3625, 3630, 3635, 3640, 3645, 3650, 3655, 3660, 3665, 3670, 3675, 3680, 3685, 3690, 3695, 3700, 3705, 3710, 3715, 3720, 3725, 3730, 3735, 3740, 3745, 3750, 3755, 3760, 3765, 3770, 3775, 3780, 3785, 3790, 3795, 3800, 3805, 3810, 3815, 3820, 3825, 3830, 3835, 3840, 3845, 3850, 3855, 3860, 3865, 3870, 3875, 3880, 3885, 3890, 3895, 3900, 3905, 3910, 3915, 3920, 3925, 3930, 3935, 3940, 3945, 3950, 3955, 3960, 3965, 3970, 3975, 3980, 3985, 3990, 3995, 4000, 4005, 4010, 4015, 4020, 4025, 4030, 4035, 4040, 4045, 4050, 4055, 4060, 4065, 4070, 4075, 4080, 4085, 4090, 4095, 4100, 4105, 4110, 4115, 4120, 4125, 4130, 4135, 4140, 4145, 4150, 4155, 4160, 4165, 4170, 4175, 4180, 4185, 4190, 4195, 4200, 4205, 4210, 4215, 4220, 4225, 4230, 4235, 4240, 4245, 4250, 4255, 4260, 4265, 4270, 4275, 4280, 4285, 4290, 4295, 4300, 4305, 4310, 4315, 4320, 4325, 4330, 4335, 4340, 4345, 4350, 4355, 4360, 4365, 4370, 4375, 4380, 4385, 4390, 4395, 4400, 4405, 4410, 4415, 4420, 4425, 4430, 4435, 4440, 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5275, 5280, 5285, 5290, 5295, 5300, 5305, 5310, 5315, 5320, 5325, 5330, 5335, 5340, 5345, 5350, 5355, 5360, 5365, 5370, 5375, 5380, 5385, 5390, 5395, 5400, 5405, 5410, 5415, 5420, 5425, 5430, 5435, 5440, 5445, 5450, 5455, 5460, 5465, 5470, 5475, 5480, 5485, 5490, 5495, 5500, 5505, 5510, 5515, 5520, 5525, 5530, 5535, 5540, 5545, 5550, 5555, 5560, 5565, 5570, 5575, 5580, 5585, 5590, 5595, 5600, 5605, 5610, 5615, 5620, 5625, 5630, 5635, 5640, 5645, 5650, 5655, 5660, 5665, 5670, 5675, 5680, 5685, 5690, 5695, 5700, 5705, 5710, 5715, 5720, 5725, 5730, 5735, 5740, 5745, 5750, 5755, 5760, 5765, 5770, 5775, 5780, 5785, 5790, 5795, 5800, 5805, 5810, 5815, 5820, 5825, 5830, 5835, 5840, 5845, 5850, 5855, 5860, 5865, 5870, 5875, 5880, 5885, 5890, 5895, 5900, 5905, 5910, 5915, 5920, 5925, 5930, 5935, 5940, 5945, 5950, 5955, 5960, 5965, 5970, 5975, 5980, 5985, 5990, 5995, 6000, 6005, 6010, 6015, 6020, 6025, 6030, 6035, 6040, 6045, 6050, 6055, 6060, 6065, 6070, 6075, 6080, 6085, 6090, 6095, 6100, 6105, 6110, 6115, 6120, 6125, 6130, 6135, 6140, 6145, 6150, 6155, 6160, 6165, 6170, 6175, 6180, 6185, 6190, 6195, 6200, 6205, 6210, 6215, 6220, 6225, 6230, 6235, 6240, 6245, 6250, 6255, 6260, 6265, 6270, 6275, 6280, 6285, 6290, 6295, 6300, 6305, 6310, 6315, 6320, 6325, 6330, 6335, 6340, 6345, 6350, 6355, 6360, 6365, 6370, 6375, 6380, 6385, 6390, 6395, 6400, 6405, 6410, 6415, 6420, 6425, 6430, 6435, 6440, 6445, 6450, 6455, 6460, 6465, 6470, 6475, 6480, 6485, 6490, 6495, 6500, 6505, 6510, 6515, 6520, 6525, 6530, 6535, 6540, 6545, 6550, 6555, 6560, 6565, 6570, 6575, 6580, 6585, 6590, 6595, 6600, 6605, 6610, 6615, 6620, 6625, 6630, 6635, 6640, 6645, 6650, 6655, 6660, 6665, 6670, 6675, 6680, 6685, 6690, 6695, 6700, 6705, 6710, 6715, 6720, 6725, 6730, 6735, 6740, 6745, 6750, 6755, 6760, 6765, 6770, 6775, 6780, 6785, 6790, 6795, 6800, 6805, 6810, 6815, 6820, 6825, 6830, 6835, 6840, 6845, 6850, 6855, 6860, 6865, 6870, 6875, 6880, 6885, 6890, 6895, 6900, 6905, 6910, 6915, 6920, 6925, 6930, 6935, 6940, 6945, 6950, 6955, 6960, 6965, 6970, 6975, 6980, 6985, 6990, 6995, 7000, 7005, 7010, 7015, 7020, 7025, 7030, 7035, 7040, 7045, 7050, 7055, 7060, 7065, 7070, 7075, 7080, 7085, 7090, 7095, 7100, 7105, 7110, 7115, 7120, 7125, 7130, 7135, 7140, 7145, 7150, 7155, 7160, 7165, 7170, 7175, 7180, 7185, 7190, 7195, 7200,

Oil Stones, &c.

Chicago Wheel & Mfg. Co., 1901 list:
Gem Corundum Oil, Double Grit, 50%
Gem Corundum Axe, Single or Double Grit, 50% Gem Corundum Razor Hones, 50%
Pike Mfg. Co., 1901 list:
Arkansas St. No. 1, 3 to 5½ in. \$2.80 Arkansas St. No. 1, 5½ to 8 in. \$3.50 Arkansas Slips, No. 1, \$4.00 Lily White Washita, 4 to 8 in. 60¢ Rosy Red Washita, 4 to 8 in. 60¢ Washita St., Extra, 4 to 8 in. 50¢ Washita St., No. 1, 4 to 8 in. 40¢ Washita St., No. 2, 4 to 8 in. 30¢ Lily White Slips, .90¢ Rosy Red Slips, .90¢ Washita Slips, Extra, .90¢ Washita Slips, No. 1, .70¢ Washita Slips, No. 2, .40¢ India Oil Stones (entire list) .30¢ Quickeut Emery and Corundum Oil Stone, Double Grit, .30¢ Quickeut Emery and Corundum Axe Grit, .30¢ Quickeut Emery Rubbing Blocks, .30¢ Hindostan, 1 lb. R. glar. \$1.80 Hindostan, No. 1, Small, 1 lb. 10¢ Axe Stones (all kinds), .40¢ Turkey Oil Stones, Extra, 5 to 8 in., .50¢ Queer Creek Stones, 4 to 8 in. 20¢ Queer Creek Slips, .40¢ Sand Stone, .60¢ Belgian, German and Swaty Razor Hones, .50¢ Natural Grit Carving Knife Hones, .30¢ Quick Edge Pocket Knife Hones, .25¢ Mounted Kitchen Sand Stone, .30¢ Stoners, Cherry—

Enterprise .25@30%

Stoppers, Bottle—

Victor Bottles Stoppers, per gross, \$9.00
Stops—Bench—
Millers Falls, .15&10%
Morrill's, 1 lb. doz., No. 1, \$10.00 .50¢
Morrill's, No. 2, \$12.50 .50¢
Door—
Chapin-Stephens Co., .60@60&10%
Plane—
Chapin-Stephens Co., .20¢
Straps—Box—
Cary's Universal, case lots, .20&10&10%
Hame—
Cover's Saddlery Works, .60@10%
Stretchers, Carpet—
Cast Iron, Steel Points, doz. 60@60&10%
Socket, .10@10&10% doz, \$1.60
Excelsior Stretcher and Tack Hammer Combined, per doz, \$6.00 .20¢
Stuffers, Sausage—
Enterprise Mfg. Co., .25@25&7½% National Specialty Co., list Jan. 1, 1902 .30&5%
Sweepers, Carpet—
National Sweeper Co., per doz. Auditorium, Roller Bearing (2 in. case), Nickel, \$64.00 Mammoth, Roller Bearing (30 in. case), Nickel, \$60.00 Marion, Roller Bearing, regular finishes, full Nickel, \$24.00 Marion Queen, Roller Bearing, full Nickel, \$24.00 Monarch, Roller Bearing, N. k. \$22.00 Monarch, Roller B'r'g, Jap'ned, \$20.00 Transparent, Roller Bearing, Plate Glass Top, Nickel, \$36.00 Monarch Extra, Roller Bearing (17-in. case), Nickel, \$36.00 Monarch Extra, Roller Bearing (17-in. case), Japanned, \$33.00 National Queen, Fancy Veneers, \$27.00 Perpetual Regular B'r'gs, N. k., \$20.00 Perpetual, Regular B'r'gs, Jap. \$18.00 Triple Medal, \$24.00

NOTE.—Rebates: 50¢ per dozen on three dozen lots; \$1 per dozen on five dozen lots; \$2 per dozen on ten dozen lots; \$1.50 per dozen on twenty-five dozen lots.

Tacks, Finishing Nails, &c.

New List, May 1, 1905.

American Carpet Tacks, 90¢@7½%
American Cut Tacks, .90¢@7½%
Swedes Cut Tacks, .90¢@7½%
Swedes Upholsterers' Tacks, 90¢@50%
Gimp Tacks, .90¢@50%
Lace Tacks, .90¢@50%
Trimmers' Tacks, .90¢@7½%
Looking Glass Tacks, .65¢
Bill Posters' and Railroad Tacks, 90¢@50%
Hungarian Nails, .85¢
Finishing Nails, .70¢
Trunk and Clout Nails, .80@5%

NOTE.—The above prices are for Standard Weights. An extra 5% is given on Medium Weights, and an extra 10d5% is given on light weights.

Miscellaneous—**Double Pointed Tacks, .90@6 or 7 tons**

Steel Wire Brads, R. & E. Mfg. Co., list .50@10@60%
See also Nails, Wire.

Tanks, Oil—

Each.
Emerald, S. S. & Co., 30-gal. \$3.40
Emerald, S. S. & Co., 60-gal. \$4.25
Queen City, S. S. & Co., 30-gal. \$3.65
Queen City, S. S. & Co., 60-gal. \$4.50

Tapes, Measuring—**American Asses' Skin .50@5@150@10d5%**

Patent Leather, .25@30d5%
Steel, .40@40d5%
Chesterman's, .25@25d5%
Eddy Asses' Skin, .40@10d5%
Eddy Patent Leather, .25@30d5%
Eddy Steel, .40@40d5%

Sheet, .per 100 lbs., \$7.25@7.50**Keuffel & Esser Co.:**

Favorite, Ass Skin, .40@10@50%
Favorite, Duck and Leather, .25@5@25d5@10%
Metallic and Steel, lower list, .35@35d5%
Pocket, .35@35d5%
Lufkin's, Asses' Skin, .40@10@50%
Metallic, .30@30d5%
Patent Bend, Leather, .25@25d5@10%
Pocket, .40@40d5%
Steel, .33@35d5%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, 5/8-inch and larger, . per 100 lbs. \$3.00

Thermometers—

Tin Case, .80@10@80d10d10%

Ties, Bale—Steel Wire—

Single Loop, .80d2½%

Monitor, Cross Head, &c., .70d%**Brick Ties—**

Niagara Brick Ties, .25@10%

Tinners' Shears, &c.—

See Shears, Tinners', &c.

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tips, Safety Pole—

Cover's Saddlery Works, .60@10%

Tire Binders, Upsetters, &c.—

See Binders and Upsetters, Tire.

Tools—Coopers'—

L. & I. J. White, .20@20d5%

Hay—

Myers' Hay Tools, .50¢

Stowell's Hay Carriers, .50¢

Stowell's Hay Forks, .50¢

Stowell's Fork Pulleys, .50¢

Saw—

Atkins' Cross Cut Saw Tools, .40¢

Simonds' Improved, .33½¢

Simonds' Crescent, .25¢

Ship—

L. & I. J. White, .25¢

Transom Lifters—

See Lifters, Transom.

Traps—Fly—

Balloon, Globe or Acme, doz. \$1.15@1.25; gro. \$1.15@1.25
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Harper, Champion or Paragon, doz. \$1.25@1.40; gro. \$1.30@1.35

Game—

Oneida Pattern, .75@10@75d10d5%

Newhouse, .45@45d5%

Hawley & Norton, .65¢

Victor and Oneida, .70@10@75d10d5%

O. C. Jump (Blake Pat.), .60@60&10d10%
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Mouse and Rat—

Mouse, Wood, Choker, doz. holes 8½@9¢

Mouse, Round or Square Wire, doz. 85¢@90¢

Marty French Rat and Mouse Traps (Genuine):

No. 1, Rat, each \$1.21; per doz. \$13.25

No. 3, Rat, per doz. \$6.50; case of 50 \$32.50

No. 3½, Rat, per doz. \$5.25; case of 72 \$27.00
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No. 4, Mouse, per doz. \$3.85; ca. 100 doz. \$38.00

No. 5, Mouse, per doz. \$3.00; case of 150 \$30.00
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Monarch, Roller Bearing, N. k. \$22.00
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Monarch, Roller B'r'g, Jap'ned, \$20.00

Monarch Extra, Roller Bearing (17-in. case), Nickel, \$36.00
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Monarch Extra, Roller Bearing (17-in. case), Japanned, \$33.00
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National Queen, Fancy Veneers, \$27.00
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Perpetual Regular B'r'gs, N. k., \$20.00
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Perpetual, Regular B'r'gs, Jap. \$18.00

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